Liberty University

School of Music

Easy as 1, 2, 3: An Analysis of Rhythm-Counting Systems and Their Affect on Performance Accuracy in Beginner Band Students

A Thesis Submitted to

the Faculty of the School of Music

in Candidacy for the Degree of

Doctor of Music Education

by

Brendan Beiersdorfer

Lynchburg, Virginia

November/2024

Abstract

Music educators implement rhythm-counting and syllable systems globally to guide students in rhythm interpretation and performance. These systems are often associated with music disciplines and cultural regions; however, the influence of these systems on students' rhythmic performance accuracy is not well-documented. This quantitative, quasi-experimental study aimed to evaluate the effectiveness of the Traditional, Kodály, and Takadimi rhythm-counting systems on the rhythmic performance of beginner band students. The sample included students from three educational settings (n = 146), each providing instruction in one of the three rhythm-counting systems. Pre- and post-instruction assessments were administered to measure rhythmic accuracy and compare each instructional approach's efficacy. The analysis employed a paired-samples *t*-test and ANOVA to assess the impact of each rhythm-counting system on student performance outcomes. Results indicated that each system significantly affected students' rhythmic accuracy post-instruction. However, ANOVA results revealed no statistically significant differences among the three rhythm-counting systems, suggesting no one system demonstrated a superior effect on rhythmic accuracy in beginner band contexts. Future research should consider longitudinal designs with participants receiving instruction exclusively in a single rhythm-counting system across various musical domains to reduce confounding variables and enhance consistency. Additionally, studies in diverse geographic and cultural settings and research involving advanced students and more complex rhythmic material could further elucidate the relative effectiveness of rhythm-counting systems. Such research is critical to thoroughly assess the range of counting systems and determine which approaches best support student performance.

Keywords: Rhythm, counting system, Traditional, Kodály, Takadimi

Acknowledgments

I want to acknowledge and thank my advisor, Dr. Nathan Street, for his constant support, encouragement, excellent critiques, and guidance. Additionally, I would like to thank my reader, Dr. Larry Seipp, for his reviews, valuable insight, and guidance in developing this thesis project.

Contents

List of Tables

List of Figures

Abbreviations

AMMA:	Advanced Measures of Music Audiation
ANOVA:	Analysis of Variance
AP:	Advanced Placement
CSV:	Comma Separated Values
DAW:	Digital Audio Workstation
FJH:	Frank J. Hackinson
IQ:	Intelligence Quotient
IRB:	Institutional Review Board
MIDI:	Musical Instrument Digital Interface
MLT:	Music Learning Theory
SPSS:	Statistical Package for the Social Sciences
TCMP:	Tenpo Consistency Measurement Procedure
UFSD:	Union Free School District
WAV:	Waveform Audio Format File

CHAPTER ONE: INTRODUCTION

Rhythm is a fundamental element for music performance, necessitating precision and extensive comprehension for synchronous execution. This quantitative quasi-experimental research study will explore different rhythm-counting systems for teachers to supplement their rhythm teaching. The study aims to ascertain the most productive rhythm-counting system tailored for beginner band directors. Chapter One will discuss the background of rhythm-counting systems and rhythm instruction, the conceptual and theoretical frameworks that guide this research, and statements of the problem, significance, and purpose of this research. The chapter will conclude with research questions and pertinent definitions of terms essential for readers' comprehension of the subsequent chapters.

Background

Historical Background

Contemporary rhythm-counting systems exemplify the utilization of mnemonics as memory aids. Since the 18th century, scholars and educators have cultivated mnemonic techniques to enhance working memory performance, fostering advancements across diverse academic domains, including music education. Music possesses mnemonic qualities, enabling the association of melodies with concepts to facilitate memorization. Songs have often served as mnemonics to bolster memory retention. Hom and Wolf state, “In the ABC song, for example, the alphabet is sung to the familiar melody ‘Twinkle, twinkle, little star,’ to support learning the alphabet in school-age children.”[1] Rhythm-counting systems originate from various word association methods, showcasing the effectiveness of mnemonics in improving memorization. In

[1] Candice Hom and David E. Wolf, “Use of Melodies as Structural Prompts for Learning and Retention of Sequential Verbal Information by Preschool Students,” *Journal of Music Therapy*, (Stockton: National Association for Music Therapy, Inc., 1993).

response to the imperative of facilitating rhythmic comprehension, educators developed mnemonic devices and syllabic systems. These pedagogical innovations were aimed at aiding students in the accurate understanding and execution of rhythmic patterns, thereby enriching their musical proficiency.

For decades, attaining rhythmic literacy has posed a persistent challenge for instrumental music students. Van Nuys and Weaver posit the inability to read rhythms accurately from staff notation is often the cause of difficulty in music reading for both novices and experienced performers.[2] The development of rhythm-counting systems in response to this challenge enhanced rhythmic literacy. The origins of these systems date back to the late nineteenth century in Europe. David Row states, "[Rhythm-counting systems] became prominent with the rise of public-school instrumental music programs."[3]

The assertion that the Traditional counting system predominates as the most popular and extensively utilized rhythm-counting system among secondary-level music educators in America implies a prevailing trend. However, recognizing alternative rhythm-counting systems taught in American music education settings suggests a notable need for uniformity and consistency across instructional practices. While the Traditional counting system enjoys widespread adoption, the existence and utilization of other systems underscore a diverse landscape of pedagogical approaches within the field. This diversity may reflect varying teaching philosophies, educational contexts, and individual preferences among educators. Ultimately, the coexistence of multiple rhythm-counting systems highlights the need for further examination and dialogue

---

[2] Kelvin Van Nuys and Homer E. Weaver, "Memory span and visual pauses in reading rhythms and melodies," *Psychological Monographs*, (1943).

[3] David Row, "Rhythm Syllable Systems- What to use and why!" Make Moments Matter- A Music Education Website, (Kansas City, 2022).

regarding instructional methodologies and their implications for student learning outcomes. Bruce Dalby states:

> Given the enormous diversity of rhythm- perhaps it is no surprise that there is a wide range of opinions about how to teach it. It seems that every approach to music education pedagogy—Kodály, Dalcroze, beat-impulse, undergraduate music theory—prescribes its own unique set of methods and techniques for teaching rhythms. Consistency of instruction is difficult to find from classroom to classroom within the same school, let alone between schools, communities, and states. Even within the same band program, students may learn differing syllable (counting) systems when they move from one level to the next.[4]

The abundance of options available to music teachers when selecting rhythm-counting systems causes a lack of consistency among educators. Introducing different rhythm-counting systems across schools may require clarification for students, who may need help differentiating between their teachers' approaches. Districts can mitigate student confusion and provide a cohesive learning experience by promoting uniformity in instructional practices. This approach fosters clarity and coherence in rhythmic instruction, ultimately enhancing students' ability to comprehend and apply rhythmic concepts effectively.

In 2014, Paney and Buonviri studied twelve AP music theory teachers to ascertain their approaches to teaching melodic dictation. One notable topic of discussion within the study was the teachers' hesitancy or indecision regarding adopting a specific rhythm-counting system for their instructional practices. This aspect sheds light on the complexities and variations in pedagogical approaches employed by music educators, particularly concerning rhythmic instruction. One of the teachers involved expresses his indecisiveness:

> As you talk to people, you're going to find a wider variety of opinions on what's the best way to do this. And not only that, but maybe some pretty militant feelings about it. Maybe it’s because we've gone our own way with this and we like our way. We don't

---

[4] Bruce Dalby, “Toward an Effective Pedagogy for Teaching Rhythm: Gordon and Beyond,” *Music Educators Journal*, (Albuquerque: Sage Publishing, 2005), 54.

> seem to [worry] much about how to put a chord in four voices. . . . There's a good method to teach that. But here, this is very open-ended.[5]

Rhythm-counting systems in music pedagogy often present a more abstract and variable aspect than other musical concepts. While many music principles may have universally accepted methodologies, rhythm instruction exhibits greater diversity and variability among educators. Unlike some concepts taught uniformly across music education, such as essential note reading or fundamental music theory principles, rhythm instruction may involve various approaches and methodologies. This variability can stem from pedagogical philosophies, cultural influences, and individual preferences among educators. Consequently, teaching rhythm may be subject to more discrepancies and differences in practice across various educational contexts.

Rhythm-counting systems can vary significantly from one another due to several distinguishable attributes. Feldman and Contzius list specific characteristics that make a rhythm-counting system effective:

1. It is based on how the rhythm sounds, not on how it is notated. Since enrhythmic figures sound identical to each other, they mean the same thing and should receive the same syllables.
2. Each unique metrical subdivision receives a unique syllable. For example, the syllable for the second of three subdivisions should be different than the syllable for the second of two subdivisions. Triple subdivision means something different from duple subdivision, and the syllables should reinforce that.
3. Its syllables are easy to say, chant, or sing.
4. The system can express simple and complex rhythms.
5. The system is suitable for use at multiple levels of education.[6]

Each of these attributes facilitates the comprehension and execution of rhythmic patterns. Feldman and Contzius meticulously examine the nuanced factors contributing to disparities and

---

[5] Andrew S. Paney and Nathan O. Buonviri, "Teaching Melodic Dictation in Advanced Placement Music Theory," *Journal of Research in Music Education*, (University: Sage Publishing, 2014), 406.

[6] Evan Feldman and Ari Contzius, *Instrumental Music Education: Teaching with the Musical and Practical in Harmony*, (New York: Routledge, 2011) 23.

discord among music educators utilizing diverse rhythm-counting methodologies. The proposition of a singularly efficacious rhythm-counting system, empirically validated to optimize rhythmic development across all student demographics, holds considerable merit. In such an ideal scenario, the proliferation of multiple rhythm-counting systems would become obsolete, overruled by the universally endorsed approach. Consequently, the divergences and discrepancies stemming from individual preferences would dissipate, fostering a standardized pedagogical framework analogous to other facets of musical instruction.

Rhythm Counting Systems

Gordon

Edwin Gordon developed a rhythm-counting system that extends his Music Learning Theory. The system focuses on divisions of marcobeats and microbeats with a consistency between changing meters. Bacon states, "This system uses the syllable 'du' for macrobeats, 'de' for microbeats in duple meter, and 'da di' for microbeats in triple meter."[7] The syllables of this counting system establish a consistency between meters, which makes the transition between simple and compound meters less daunting for students.

Kodály

Zoltan Kodály's rhythm-counting system is syllable-based and has become popular in elementary school settings. This system differs from Gordon's as it does not follow a relative relationship between notes and beats. Feldman and Contzius state, "For example, 'ta' refers to a quarter note, regardless of whether the quarter note receives the beat. This is useful for developing reading and dictation skills but is less compatible with a contemporary 'sound-to-

[7] Terence Edward Bacon, "A comparison of rhythm syllable systems used in beginning instrumental instruction," (Ann Arbor: Michigan State University ProQuest Dissertations Publishing, 1998), 17.

symbol' approach."[8] Kodály's rhythm-counting system promotes intuitiveness and accessibility, making it suitable for students of all ages and levels of musical experience. By providing a structured and consistent framework for rhythmic instruction, the system enables students to develop a strong foundation in rhythmic literacy and performance skills.

Traditional

The Traditional counting system has become the most popular system for instrumentalists. Another aspect of this counting system involves beat orientation, where various syllables (or, in this case, numbers) correspond to each beat within a measure. However, this attribute does not make the system conducive for young children, and as a result, it is used sparingly in elementary schools. Additionally, there is a bit of ambiguity and obscurity in the distinction between triple subdivisions, in which the first two syllables of a triple end are the same as the first three syllables of sixteenth notes, thus creating confusion.[9] While other rhythm counting systems have been developed and introduced over time, the Traditional counting system endures as a foundational tool for musicians of all levels. Its simplicity and universality make it accessible to students and educators worldwide, contributing to its enduring legacy in music education.

Takadimi

Music theorists Richard Hoffman, William Pelto, and John W. White developed Takadimi, a beat-oriented rhythm-pedagogy system that uses syllables that are easy to say and understand. Takadimi allows teachers to adjust syllables to meet the needs of their students. Ester, Scheib, and Inks state:

---

[8] Feldman and Contzius, *Instrumental Music Education*, 23.

[9] Ibid., 26.

> First, Takadimi can be used with the youngest learners. Second, Takadimi provides distinct syllables for simple and compound meters, thereby helping students become proficient in both meters from the very beginning. And finally, Takadimi results in a more accurate performance of duplets and triplets, other irregular divisions, and patterns in changing and irregular meters.[10]

The Takadimi system provides a versatile and comprehensive approach to teaching rhythm. It offers a structured method for students to understand and perform complex rhythmic patterns. It emphasizes the importance of internalizing rhythmic concepts through vocalization and rhythmic solfege, enabling students to develop a strong sense of rhythm and timing.

Eastman

Developed by William Street at the Eastman School of Music in Rochester, New York, the Eastman Counting System employs a syllabic approach, where specific syllables represent different rhythmic elements. These syllables correspond with the sounds and durations of musical rhythms, providing a vocalized method for students to internalize and perform rhythmic patterns accurately. Strovas states, "The Eastman System gives you an easily understandable means to move from beat to beat by using syllabic sounds, while still maintaining the numbering system…if two notes are beamed together, the first note is numbered as the beat and the second note is labeled with a 'te' syllable."[11] The Eastman rhythm counting system is widely adopted in music education, particularly for percussion and instrumental instruction. Its clarity and effectiveness in teaching rhythm have made it a valuable resource for students and educators, helping develop strong rhythmic skills and musical understanding.

---

[10] Don P. Ester, John W. Scheib, and Kimberly J. Inks, "Takadimi: A Rhythm System for All Ages," *Music Educators Journal*, (Reston: MENC: National Association for Music Education, 2006), 62.

[11] Scott Strovas, "Wayland Baptist University: 3 Great Things About Eastman Counting System," *Targeted News Service,* (Washington D.C.: Wayland Baptist University School of Music, 2021).

Theoretical Background

Émile Jacques-Dalcroze was one of the most influential musical educators in the development of rhythm pedagogy. His theory of "eurhythmics" embraces the physical aspect of music and claims rhythm is movement in music, and to fully immerse oneself in music, one must engage one's muscles.[12] Feldman and Contzius state, "[Dalcroze] believed the first faculty that develops is the muscular system's perception of rhythm; that the body is naturally rhythmic—from the beating of the heart, to the pace of the breath, to the meter of walking, to the conscious motion of limbs and fingers."[13] Young students who have not yet encountered music notation can experience this kinesthetic approach to learning rhythm. Dalcroze believed these experiences were critical to musical development and planted the seeds required for students to progress to instrumental instruction in the future to have success. Landis and Carder state, "Dalcroze insisted that instrumental study should not precede rhythmic study and ear training."[14] Therefore, elementary general music educators are encouraged to have their students physically move to and experience music before learning to decipher music notation or play a musical instrument.

Edwin Gordon was another influential music educator who contributed to developing rhythm pedagogy. He composed a music learning theory (MLT), a comprehensive theory of how individuals learn music. Gordon posits that music learning is an aural process, with students acquiring musical skills through listening and internalizing musical patterns before attempting to reproduce them. Music Learning Theory emphasizes the importance of audiation, the ability to

---

[12] Émile Jacques-Dalcroze, *Eurhythmics, Art, and Education,* (New York: B. Blom, 1972), 97.

[13] Feldman and Contzius, *Instrumental Music Education,* 19.

[14] Beth Landis and Polly Carder, *The Eclectic Curriculum in American Music Education: Contributions of Dalcroze, Kodály, and Orff,* (Washington: Music Educators National Conference, 1972), 10.

hear and comprehend music without the presence of sound.[15] Gordon states, "We audiate when listening to, recalling, performing, interpreting, creating, improvising, reading, or writing music. Though it may seem contradictory, we can listen to music and at the same time audiate music."[16] This suggests that audiation serves as the foundation for musical development and proficiency.

By linking new content with existing knowledge or experiences, students can enhance their understanding and retention of the material. This process allows learners to contextualize new information within familiar frameworks, making it more accessible and meaningful. Wang states, "Associative learning is a common approach to acquire multiple associated signals, including knowledge, experiences, and skills from the natural environment or social interaction. Associative memory stands for the integrative storage and reciprocal retrieval of these associated signals, essential for cognitive processes, emotional reactions, and behaviors."[17] Associative learning makes content more memorable for students as they connect to their past experiences and prior knowledge of concepts associated with new material. By anchoring new concepts to familiar ones, learners can deepen their understanding and enhance retention, fostering meaningful and lasting learning outcomes. Feldman and Contzius state, "As we have seen with Gordon's Music Learning Theory, one of the links between hearing a pattern and being able to read its notation is 'verbal association,' which provides an aural label for a sound."[18] Linking words to specific components of rhythms serves as a potent mnemonic strategy, rendering the rhythmic patterns more memorable for students. This associative process enhances memorization

---

[15] Edwin E. Gordon, *Learning Sequences in Music*, (Chicago: GIA Publications, 2018).

[16] Ibid.

[17] Jin-Hui Wang, *Associative Memory Cells: Basic Units of Memory Trace,* (Beijing: Springer Nature Singapore Pte Ltd., 2019), v.

[18] Evan Feldman and Ari Contzius, *Instrumental Music Education*, 23.

and fosters a deeper comprehension of the rhythmic structure and its functional role in musical performance. Many elementary general music teachers adhere to the "sound before sight" approach, wherein students are exposed to rhythmic patterns through auditory experiences before encountering them in written notation. Consequently, when students confront rhythm notation, they often draw upon their prior auditory encounters, facilitating the decoding and performance of rhythms from musical notation. Thus, students demonstrate rhythmic literacy when they proficiently execute rhythms by interpreting them from notation, bridging the gap between auditory perception and visual representation in music.

In the context of teaching rhythm, Gordon's Music Learning Theory emphasizes the significance of developing rhythmic audiation skills. Rather than relying solely on notation or verbal counting methods, students are encouraged to internalize rhythmic patterns through aural exposure and imitation. Teachers employing Gordon's method in rhythm instruction often utilize syllabic systems, where specific rhythmic patterns are associated with verbal syllables or words. Students develop a strong sense of rhythmic pulse and meter through rhythmic chanting, singing, and movement activities, enabling them to accurately interpret and perform rhythmic patterns.

Warren Haston applies Gordon's classic "sound before sight" approach in his 2010 study on teaching beginning woodwind instrumentalists. The study focused on the effect on student achievement between aural and visual instruction. Typically, visual aids and prompts enhance the learning experience of instrumentalists. Haston states:

> Teaching with an aural emphasis is not the most common approach to beginning wind instrument instruction. The majority of instruction is with a visual emphasis. Students are taught how to read Traditional notation—note names, 4/4 time signature, treble and bass clef—before or at the same time as learning to manipulate their instruments. Instruction often proceeds through a method book one piece at a time. New notes are introduced visually and students learn how to finger them. Once students have demonstrated an understanding of where a note is on the staff and how to finger it, then they try to play it. Particularly early on in instruction, when only one or very few notes are known, new

> notes are learned by sight without an aural context or tonal center. Students internalize what notes look like and how they are fingered, but not necessarily how they sound.[19]

The findings from the tests of this study indicated that participants in the aural/modeling group achieved higher scores on two posttests: the Watkins Farnum Performance Scale and a prepared piece. However, these differences were not statistically significant. Participants in the aural/modeling group without prior training attained the highest scores, followed by those in the visual group with previous training. The results suggest that emphasizing aural/modeling techniques while teaching is conducive to participants' music performance skills. Instead, it may even contribute to their improvement. These findings underscore the potential benefits of incorporating aural and modeling approaches into music instruction, particularly for students without prior training.

Societal Background

Rhythmic instruction within music education has historically needed more standardization due to the plethora of rhythm-counting systems available to educators. Many of these systems are adaptations or interpretations of existing methodologies, underscoring the subjective nature of determining an ideal system, which remains unsupported by empirical research. Numerous rhythm-counting systems utilized in instrumental instruction can trace their origins to two prominent methodologies in elementary general music education: the Kodály and Gordon systems. Both the Kodály and Gordon systems are rooted in the principle of word association, leveraging syllabic components derived from students' broader linguistic knowledge. This approach links words to specific rhythmic patterns, allowing students to chant them rhythmically in synchronization with musical passages. Mary Palmer's study sought to discern

---

[19] Warren Haston, "Beginning Wind Instrument Instruction: A Comparison of Aural and Visual Approaches," *Contributions to Music Education,* (Hartford: Ohio Music Educators Association, 2010), 10-11.

the relative efficacy of these two rudimentary rhythm-counting systems in facilitating accurate rhythm performance among students. The study outcomes revealed that students exhibited slightly greater success when exposed to the Gordon Rhythm-Counting System. Palmer states, "Consequently, for the sample investigated, the data do not indicate that the Gordon approach is significantly better than the [Kodály] in terms of performance achievement."[20] This study is significant since instrumental music's overall goal and basis is performance. Further research is needed to indicate which rhythm-counting system fosters the best performance results.

Similarly, Tammy Fust acknowledges the lack of research on the effectiveness of rhythm-counting systems in her 2001 thesis from the University of Kentucky:

> There is a limited body of literature devoted to the systematic analysis and comparison of methods of teaching rhythm to children. The studies are scattered over several decades, and it is difficult to base a broad conclusion on the results of these studies. Few of the studies use the same strategies, and rarely has any of the research been replicated. Most of the research reaches the general conclusion that the use of syllables or related mnemonic devices is an effective pedagogical approach for teaching rhythm.[21]

Linking syllables and mnemonic devices represents an effective strategy for enhancing students' memorability of rhythmic patterns.

Daniel Laing's study, conducted in 2007, investigated the influence of isolated instruction on rhythm and students' proficiency in performing rhythms accurately. The study involved fifty woodwind and brass instrumentalists participating in a six-week treatment program comprising four weeks of rhythm pattern instruction. Significantly, the amount of individual rhythmic instruction time varied between groups. To assess the effectiveness of the instructional

---

[20] Mary Palmer, "Relative Effectiveness of Two Approaches to Rhythm Reading for Fourth-Grade Students," *Journal of Research in Music Education*, (Urbana: Sage Publishing, 1976), 117.

[21] Tammy Renee Fust, "Syllable Systems: Four Students' Experiences in Learning Rhythm," (Louisville: Think IR, 2006), 17.

intervention, pre-instruction and post-instruction sight-reading rhythm tests were administered to the participants. These tests were objective measures to gauge the student's rhythmic skill improvements following the treatment program. Laing states, “Like other researchers have found, the results of the pretest study indicate that a student’s rhythmic reading ability improves with instruction. However, this study’s results were also consistent with previous research, which has found that rhythmic reading abilities improve over time and with experience.”[22] The findings from this study indicate that rhythmic instruction can significantly improve a student’s ability to read and perform rhythms, but only if executed properly.

More research on the specific syllables and mnemonic devices that foster optimal results for student learning would benefit the music education field. Ruth Brittin states, “It appears the vast majority of band programs in this region use the Traditional-number based '1, 2-&, 3, 4’ system of counting (Traditional). Whether this is because of tradition, because this is the system used in most method books, or because of the teacher’s careful consideration is unknown.”[23] The Traditional counting system is the predominant method in music education rhythm instruction. Despite its prevalence in several band method books, the rationale behind its widespread adoption lacks empirical support. Indeed, there is a conspicuous absence of pedagogical data elucidating why most authors of instrumental method books favor this rhythm-counting system. Consequently, the underlying factors driving its ubiquity remain uncertain, highlighting the need for further research to illuminate the rationale behind its selection and its efficacy in facilitating rhythmic comprehension and performance among students.

---

[22] Daniel Robert Laing, “The Effect of Rhythm Pattern Instruction on the Sight-Reading Achievement of Wind Instrumentalists,” (Columbia: ProQuest Dissertations Publishing, 2007), 48.

[23] Ruth V. Brittin, “Middle School Instrumentalists' Perceptions of Counting Systems,” *Council for Research in Music Education*, (Urbana: Univ of Illinois at Urbana-Champaign, 2001), 16.

In 1994, Stephen Gage conducted a study that focused on analyzing and comparing different methodologies of rhythm instruction in beginning instrumental method books. Gage meticulously examined the content and presentation of rhythms in each method book, considering factors such as rhythms introduced, the timing of their introduction, and the instructional approaches utilized. Following his comprehensive study and analysis, Gage arrived at a significant conclusion. He asserted that the specific rhythm-counting system or methodology implemented in music instruction may not be as crucial as the consistency and frequency of application.[24] This highlights the importance of music educators selecting a rhythm-counting system and adhering to it consistently throughout their instruction. Gage concludes the effectiveness of rhythm instruction is not solely dependent on the choice of methodology but also on its implementation.

Consistency and regularity in presenting rhythmic concepts contribute significantly to students' comprehension and mastery of rhythm. Therefore, music educators are encouraged to select a rhythm-counting system that aligns with their pedagogical philosophy and instructional goals while maintaining consistent application to optimize student learning outcomes.

Summary

The history of rhythm instruction reveals the utilization of mnemonic devices and syllabic systems as memory aids, dating back to the 18th century. Music's mnemonic qualities enable associations between melodies and concepts, enhancing memorization. The development of rhythm-counting systems aimed to aid students in understanding and executing rhythmic patterns accurately. Despite the persistent challenge of attaining rhythmic literacy, rhythm-

---

[24] Stephen Lawrence Gage, “An Analysis and Comparison of Rhythm Instructional Materials and Techniques for Beginning Instrumental Music Students,” (Champaign: University at Illinois at Urbana-Champaign ProQuest Dissertations Publishing, 1994).

counting systems emerged in response, tracing back to the late 19th century in Europe. Associative learning, linking new content with existing knowledge, fosters deeper comprehension and retention. The prevalence of multiple systems underscores a need for uniformity, necessitating further examination of instructional methodologies.

Émile Jacques-Dalcroze's eurhythmics and Edwin Gordon's Music Learning Theory emphasize kinesthetic and aural approaches to rhythm instruction. Gordon's theory prioritizes audiation and verbal association, facilitating the internalization of rhythmic patterns. Studies have demonstrated the effectiveness of aural/modeling instruction on rhythm performance skills, suggesting the benefits of incorporating auditory and kinesthetic techniques.

There is a lack of standardization in rhythm instruction, with diverse systems originating from methodologies like Kodály and Gordon. Despite prevailing trends, the rationale behind the Traditional counting system's dominance remains uncertain, warranting further research. Studies have explored different instructional approaches, emphasizing the importance of consistency in rhythm instruction regardless of the chosen methodology. Rhythm instruction encompasses mnemonic techniques, theoretical frameworks, and societal factors, highlighting the need for further research to inform effective pedagogical practices.

The Problem Statement

The literature must confirm that the Traditional counting system is the most effective and deserves to appear in method books available to beginning instrumental students. There is also a need for more consistency in implementing rhythm-counting systems within school districts, as teachers in different buildings teach with other systems, ultimately confusing students. However, it is essential to note that an agreed-upon rhythm-counting system will serve as a universal system that works only for some students in the room. Paney and Buonviri address the difficulty

teachers have in deciding between the different rhythm-counting systems available for instruction:

> Although these teachers were confident in their choice of a pitch system, they were much less confident in their choice of a rhythm counting system, if they chose one at all. It is possible that students' difficulty with rhythmic notation may be compounded by teachers' lack of a clear way of teaching it. Further investigations into the efficacy of using a rhythm counting system, particularly at the high school level, could be of benefit to teachers.[25]

Given the overwhelming number of available systems, teachers are still determining the best way to teach students to count rhythms. Inconsistencies in teachers' chosen counting systems may lead to confusion among students. Furthermore, the students involved in Paney and Buonviri's study were in Advanced Placement Music Theory, one of the most rigorous music courses available to high school students. This shows the significant discrepancy in rhythm instruction if the teachers of an advanced music class with some of the most capable students cannot agree on a consistent methodology to teach one of the most fundamental music concepts. If teachers disagree on which rhythm-counting system to implement for instruction, their students will be confused and not perform to their full potential.

The problem is that the literature must fully address all the viable options for teaching rhythm. Music educators need to raise awareness of the many rhythm-counting systems available, among which one may be the most effective choice. Despite this, the Traditional rhythm counting system (1 e + a) remains the most widely practiced for music instruction in middle schools across North America. Varley states, "360 of the teachers (99%) indicated that they knew the [Traditional counting] system and felt comfortable teaching it, making it the best-known system."[26] This study aims to explore other counting systems and determine which is the

---

[25] Paney and Buonviri, "Teaching Melodic Dictation," 410.

best viable option for beginner band teachers. Students learn in different ways, so while a rhythm system that works for most students will be an effective discovery, teachers may still require implementing alternative systems to meet the needs of all their students.

The Purpose Statement

This quantitative quasi-experimental research study seeks to ascertain which rhythm-counting system is most effective for beginner band students: Traditional, Kodály, or Takadimi. Three elementary music summer and school programs will use one of three rhythm-counting systems to instruct beginner band students, focusing on rhythmic function, beat orientation, and syllable usage. The study will consist of fourth-grade band students of varied rhythmic aptitude, all of which have yet to have prior instrumental music experience. The administration of pre-instruction and post-instruction rhythmic performance assessments will quantify each system's instructional effectiveness. Through comparative cross-analysis of the data, the study aims to identify which counting system enhances young musicians' performance accuracy the most through instruction. The findings will provide insights for music educators to determine the most suitable rhythm-counting system for all beginner instrumental students.

Gloria Hill states the following in response to her interviews with several authors of piano method books:

> When asked to state their reasoning for using a counting method, half of the authors that chose the numeric system cautioned that any counting system could go wrong if the student fails to say the beat and keep a steady pulse. One author, however, stated that any counting system could succeed if two things occur, thorough preparation and counting aloud done by the student, not the teacher. Another author stated that numeric counting focuses on the beat and that "syllabic [counting] is another whole set of symbolism that has to be learned on top of the basic point."[27]

---

[26] Paul C. Varley Jr., "An Analysis of Rhythm Systems in the United States: Their Development and Frequency of Use by Teachers, Students, and Authors; and Relation to Perceived Learning Preferences," (Ann Arbor: Saint Louis ProQuest Dissertations Publishing, 2005), 88.

Despite being widely adopted in music education for generations, the Traditional rhythm-counting system has yet to receive much scrutiny for its effectiveness. While teachers may have preferences based on personal experience, it is crucial to prioritize students' learning outcomes by exploring and evaluating alternative systems for their instructional efficacy.

The Significance Statement

The prevalence of the Traditional rhythm-counting system in music education and a lack of performance data to support its efficacy underscores a critical need for exploring and evaluating alternative counting systems. This research study tests alternative approaches to rhythm-counting, thereby providing music educators with empirical evidence to inform their instructional practices and identify more effective rhythm-counting systems. Chosky states, "It does not matter in the least what one calls rhythmic figures, as long as the durations are sounded correctly."[28] Educators dedicate themselves to maximizing student success, and this research study reflects that commitment by exploring three different rhythm-counting systems. By thoroughly examining these systems and their effect on student performance, educators will have valuable insight to enhance their instructional practices and promote student achievement.

Experimenting with different rhythm-counting systems for instruction holds significant theoretical implications in music education. Exploring various rhythm-counting systems will engage educators in pedagogical innovation and encourage seeking new methods to enhance student learning. This experimentation fosters creativity and adaptability in teaching practices, ultimately enriching the educational experience for students. Feldman and Contzius state,

---

[27] Gloria Lynn Hill, "Teaching Rhythm to Beginning Piano Students: An Analysis of Various Counting Systems and the Integration of Kodály and Orff Rhythm Strategies," (University: The University of Mississippi ProQuest Dissertations Publishing, 2008), 45.

[28] Lois Chosky, *The Kodaly Context: Creating an Environment for Musical Learning,* (Englewood Cliffs: Prentice-Hall, 1981), 190.

"Whichever [rhythm counting system] is adopted, we recommend using the same system(s) at all levels of education, elementary through high school. This prevents the time-consuming inconvenience of practicing one system for several years and then re-learning another, somewhat akin to learning an entirely new set of note names."[29] Many rhythm-counting systems emphasize auditory skills development, encouraging students to internalize rhythmic patterns through listening and imitation. Experimenting with these systems offers opportunities to investigate their effectiveness in cultivating students' aural abilities, including audiation, rhythmic accuracy, and ensemble synchronization.

Through systematic experimentation, educators can quantitatively assess the instructional effectiveness of each rhythm-counting system. By collecting data on students' performance accuracy, comprehension, and retention of rhythmic patterns, researchers can objectively evaluate the effect of each system on learning outcomes. Fust's 2006 comparative study between elementary students' rhythm performance supplemented by the Traditional counting and Takadimi counting systems produced the following results:

> Overall, the observations suggested that students using the "Takadimi" system of counting seemed more proficient in playing without hesitations and counting using correct syllables in lessons. The students who used the "l-e-&-a" system were less likely than the "Takadimi" students to play a note longer or shorter than it was written. There was no significant difference between the performances of all four students. All students displayed some trouble in keeping a steady pulse while counting out loud or playing.[30]

Experimentation allows for comparative analysis between different rhythm-counting systems. Researchers can use other systems to identify improvement patterns and statistically compare

---

[29] Feldman and Contzius, *Instrumental Music Education*, 27.

[30] Fust, "Syllable Systems," 35.

each approach's efficacy by administering pre- and post-instruction assessments across multiple groups.

Results from the pre-instruction and post-instruction rhythm assessments using three different rhythm counting systems will indicate which system fosters the most student success. A comparative analysis of the data gathered from the results will determine which rhythm-counting system teachers should choose for their instruction. This study could potentially eliminate proposed rhythm-counting systems that some music teachers believe to be the most effective. Some of these rhythm-counting systems are intended to deepen student understanding and are different from those teachers and students should strictly adhere to. Houlahan and Tacka state, "There is ample evidence that the Hungarian rhythm syllables were not intended for a student's music education as their primary focus was to help students internalize the duration of basic rhythmic elements."[31] Rhythm-counting systems may have different intentions and purposes depending on who created them and their specific methodologies throughout this study.

By determining a preferred rhythm-counting system that fosters results in music classrooms everywhere, music educators can solve the problems of inconsistency and confusion for students who learn from teachers who allow contrasting counting systems to guide their instruction. This study will at least make music educators question the rhythm-counting system they currently implement in their instruction and encourage them to experiment to find the best system for themselves and their students. Whichever rhythm-counting system worked best for them in school may not necessarily be the best one to incorporate into their instruction. This

---

[31] Micheál Houlahan and Philip Tacka, "Sound Relationships: An Approach to Teaching Rhythm According to the Kodály Concept Using Takadimi Rhythm Syllables," *Kodaly Envoy*, (New York: Oxford University Press, 2017), 6.

study could revolutionize music education for rhythm teaching and create a universal system that will work in all instrumental music settings.

Research Questions and Hypotheses

RQ1: Is there a difference in rhythm performance accuracy among beginning band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons?

RQ2: Is there a difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems?

RQ3: Is there a difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons?

$H1_0$: There is no difference in rhythm performance accuracy among beginner band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons as measured by differences in audio frequencies via Garageband.

$H2_0$: There is no difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems as measured by differences in audio frequencies via Garageband.

$H3_0$: There is no difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons.

Core Concepts

The different syllables correlating to each rhythm-counting system are critical to this study. There are three different rhythm-counting systems practiced in this study:

1. Traditional - Sixteenth notes in simple meter are associated with the following syllables: 1-e-and-a. Eighth note triplets in compound meter are associated with the following syllables: 1-and-a
2. Kodály - Sixteenth notes in simple meter are associated with the following syllables: Ti-ri-ti-ri. Eighth note triplets in compound meter are associated with the following syllables: Tri-o-la.
3. Takadimi - Sixteenth notes in simple meter are associated with the following syllables: Ta-ka-di-mi. Eighth note triplets in compound meter are associated with the following syllables: Ta-ki-da.

Definitions

1. *Acquisition of Pulse Response* – understanding of a musical pulse, preferably through physical activities. It is a preferred, if not necessary, prerequisite to rhythm-reading instruction.[32]
2. *Audiation* – the process of assimilating and comprehending (not simply hearing) music momentarily heard performed or heard performed sometime in the past. Audiation takes place when assimilating and comprehending in the mind music that listeners may or may not have heard but are reading in notation or composing or improvising.[33]

---

[32] Muriel J. Bebeau, "Effects of Traditional and Simplified Methods of Rhythm-Reading Instruction," *Journal of Research in Music Education*, (Minneapolis: Sage Publishing, 1982), 108.

[33] Gordon, *Learning Sequences in Music,* 3.

3. *Meter* – is determined by the manner in which macrobeats are divided and grouped in audiation. Macrobeat divisions (microbeats) and macrobeat groups can be duple or triple.[34]
4. *Meter Signature* – structures time in music and conveys the basic unit of length (the beat) and groupings of beats.[35]
5. *Music Literacy* – one of the primary goals of music educator programs, the ability to read and interpret notation with independence.[36]
6. *Numeric Counting System* – uses numbers to represent the beat and reinforces the number of beats each note value receives.[37]
7. *Rhythm* – the element of music that encompasses all aspects of organizing sounds in time.[38] Rhythm traces to the origin of the word to the Greek, rhythmos, which has as its base rheein, which meaning "to flow."[39] Definitions of rhythm seem to fall into four categories:
8. *Rhythm-Reading Syllables* - a system of counting rhythm figures uses the application of rhythm syllables as a means of simplification and durational reference. Beats in each measure are counted (by number), and division and subdivisions of beats are assigned

---

[34] Dalby, "Toward an Effective Pedagogy," 59.

[35] James L. Byo, "Effects of Barlines, Pitch, and Meter on Musicians' Rhythm Reading Performance," *Journal of Band Research*, (Troy: ProQuest LLC, 1992), 34.

[36] Brittin, "Middle School Instrumentalists' Perceptions of Counting Systems," 12.

[37] Hill, "Teaching Rhythm to Beginning Piano Students," 7.

[38] Johnson Blythe Egbert, "The Effects of Systematic Rhythm Reading Instruction Versus Rote Rhythm Drill On the Pitch and Rhythm Sight-Singing Performance of High School Choral Ensemble Members," (Columbia: ProQuest Dissertations Publishing, 1990), 23.

[39] Varley, "An Analysis of Rhythm Systems in the United States," 6.

specific rhythm syllables that foster rhythmic structural understanding and rhythm precision.[40]

9. *Sight-reading* – the ability to read and perform music at first sight, without preparatory study. A thorough acquaintance with pitch and rhythm and their notation is prerequisite for sight-reading.[41]
10. *Speech Cue Method* – a combination of elements from the Orff and Kodály methods, using the Orff concept of "speech cues that have durational value closely corresponding to the actual value of the notes with which they are paired."[42]
11. *Syllabic Counting System* – uses words or syllables to represent the beat.[43]

Summary

Rhythm is an essential musical element critical to the harmonious development of young students learning to perform on musical instruments. Children are exposed to rhythm from a very young age and begin instruction of rhythm, specifically in their general music classes at the elementary level. To aid in their understanding, music teachers frequently employ rhythm-counting systems, associating notes with words or syllables, a method proven to enhance students' accuracy in performing rhythms. However, the lack of consistency among teachers in selecting and adhering to a specific rhythm-counting system can lead to confusion among students, hindering their potential for future musical endeavors. Establishing a universal rhythm-counting system would give students a solid rhythmic foundation applicable throughout their

---

[40] Egbert, "The Effects of Systematic Rhythm Reading Instruction," 29.

[41] Willi Apel, *Harvard Dictionary of Music*, (Cambridge: Harvard University Press, 1967), 1.

[42] Bacon, "A comparison of rhythm syllable systems," 4.

[43] Hill, "Teaching Rhythm to Beginning Piano Students," 8.

musical journeys. This foundational understanding would translate into more proficient ensemble performances, as students would require less rehearsal time to grasp complex rhythms. This quantitative quasi-experimental research study explores the effectiveness of various rhythm-counting systems by analyzing data on rhythmic performance accuracy among fourth-grade band students. By cross-analyzing this data, the study aims to identify a rhythm-counting system that warrants music teachers' adoption across school districts. Such a discovery would benefit current students and shape future music educators' practices, ultimately elevating the quality of music education and performance ensembles for generations.

CHAPTER TWO: LITERATURE REVIEW

Overview

Rhythm constitutes a fundamental concept critical to the successful performance of music. It is a regular, repeated sound pattern that endows music with distinctive and recognizable qualities. For musicians within a performing ensemble, it is crucial to discern when to play and when to remain silent. Rhythmic notation offers a standardized method for executing music accurately. However, musicians must acquire the skills to read and interpret this notation to perform synchronously with other ensemble members. Inadequate mastery of rhythmic principles can result in inaccuracies and inconsistencies, impairing the ensemble's overall performance capability and potential. Music educators Bruce Pearson and Ryan Nowlin state the following regarding the importance of understanding rhythm:

> Many problems encountered in a sectional or band rehearsal stem from students' inability to count and feel rhythm. These interruptions can be minimized with daily attention to rhythm and the integration of a specific counting system. From day one, the use of a counting system encourages the development of rhythmic understanding and control of the rhythmic pulse and helps to "catalog" the rhythms the body feels into students' music memory banks.[44]

Music educators aim for their ensembles to perform at their highest potential, tackling the most challenging pieces. Students enjoy ensemble participation more when they can perform complex music successfully. Therefore, students must establish a solid rhythmic foundation and learn the fundamentals from the outset to ensure long-term success. This section will examine the function of rhythm counting systems and explore the various systems currently employed in schools nationwide. The chapter will conclude by analyzing the rhythm counting systems presented by

---

[44] Bruce Pearson and Ryan Nowlin, *Teaching Band with Excellence,* (San Diego: Kjos Music Press, 2011), 20.

authors in several instrumental method books, which serve as valuable supplements to music instruction.

Theoretical Framework

Howard Gardner, an eminent American developmental psychologist, is renowned for his theory of multiple intelligences, which he first articulated in his seminal 1983 work, "Frames of Mind." Gardner's theory posits the existence of distinct, relatively autonomous intelligences, challenging the Traditional view of a single, generalized intelligence. Gardner expands upon the notion that intelligence is not limited to performance on intelligence quotient (IQ) tests:

> I believe that we should get away altogether from tests and correlations among tests and look instead at more naturalistic sources of information about how peoples around the world develop skills important to their ways of life…All of these different roles need to be taken into account if we accept the way I define intelligence – that is, as the ability to solve problems or to fashion products that are valued in one or more cultural settings.[45]

Gardner states that people demonstrate intelligence through knowledge of the ability to learn and execute specific skills. This led Gardner to discover and identify eight intelligences: linguistic, logical-mathematical, musical, kinesthetic, spatial, interpersonal, intrapersonal, and naturalist. Thus, the mastery of skills demonstrates a mastery of one or multiple of the eight different intelligences outlined by Gardner.

Gardner's conception of musical intelligence is particularly pertinent to rhythm-counting systems in music. Musical intelligence encompasses the ability to discern, create, reproduce, and reflect on music, which includes sensitivity to rhythm, pitch, melody, and timbre. Individuals with heightened musical intelligence possess an advanced capability to recognize and interpret rhythmic patterns and sequences. Gardner states, “To attain competence in the arts, it is

---

[45] Howard Gardner, *The Development and Education of the Mind*, (New York: Taylor & Francis Group, 2006), 48.

necessary to gain literacy with these symbol systems. And so the artistically competent individual is one who is able to 'read' and to 'write' symbols in such realms as literature, music, or sculpture."[46] This skill is fundamental to rhythm-counting, which requires identifying and internalizing the beat and its subdivisions. A core component of musical intelligence is the ability to internalize and reproduce rhythmic structures autonomously. This intrinsic sense of timing is critical for the accurate execution of rhythm counting and for maintaining synchronization within musical ensembles. Musical intelligence also encompasses the creative aspect of music-making, including the ability to improvise within established rhythmic frameworks. Mastery of rhythm-counting systems enhances a musician's ability to experiment with and manipulate timing and rhythmic variations, thereby fostering creative expression. Proficient musical intellects practice acute auditory discernment, which is essential for perceiving and replicating complex rhythms. This heightened listening ability supports the effective implementation of rhythm-counting systems by enabling musicians to align their timing precisely with other performers.

Gardner's multiple intelligences theory underscores the necessity of acknowledging and cultivating diverse forms of intelligence, including musical intelligence, within educational contexts. By understanding and leveraging this intelligence, educators can develop more effective rhythm-counting systems and pedagogical approaches tailored to the strengths of individuals with pronounced musical capabilities. This, in turn, facilitates a deeper engagement with and mastery of rhythmic structures in music.

Rhythm-Counting Systems

Throughout history, diverse educators and scholars have formulated numerous rhythm-counting systems to decipher intricate rhythmic patterns. These systems share a common

---

[46] Gardner, *The Development and Education of the Mind,* 98.

objective: to establish connections between segments of rhythms and numerical values, syllables, words, or phrases. By doing so, these systems facilitate the visual, auditory, and kinesthetic comprehension of rhythmic intricacies, aiding performers in accurately interpreting and executing musical rhythms. Micheál Houlahan and Philip Tacka state, "We believe that rhythm syllables have an important role to play in developing rhythmic concepts and elements at all levels of music education."[47] The proliferation of diverse rhythm counting systems, characterized by various iterations and adaptations within each framework, poses a challenge for students. The fluctuation between different systems can induce confusion and diminish students' confidence in their ability to execute rhythms precisely. Pearson and Nowlin state, "It is not the intent of the authors to promote one specific counting system, but rather to emphasize the importance of choosing a counting system and using it consistently."[48] Periodically examining alternative counting systems can provide valuable educational perspectives and facilitate comparative evaluations relative to the predominant system employed in class.

Nevertheless, it is imperative to establish a default rhythm counting framework to mitigate student confusion and promote consistent understanding and application within musical performance contexts. Kevin Mixon states, "However, these and other well-known systems are most effective if used consistently over a long period of time…student transience is quite common, and often no uniform rhythm syllable system is used so that students have instructional consistency when changing schools."[49] Mastering music notation resembles acquiring proficiency in any language; it requires time and diligent practice. Consequently, the method

---

[47] Houlahan and Tacka, "Sound Relationships," 6.

[48] Pearson and Nowlin, *Teaching Band with Excellence*, 20.

[49] Kevin Mixon, "Decoding Notation," in *Reaching and Teaching All Instrumental Music Students,* (Plymouth: MENC: The National Association for Music Education, 2011), 68.

employed to teach and interpret this language should maintain consistency to minimize student confusion. If schools within a district unanimously adopt a standardized rhythm counting system for instruction, it could enhance performance accuracy and deepen overall student comprehension.

Gordon

Also known as the Gordon Rhythm Syllables, the Gordon rhythm-counting system is a method developed by Dr. Edwin Gordon for teaching rhythm and music reading to students. This system is part of Gordon's more extensive Music Learning Theory, which focuses on how children learn music in a manner that is similar to how they learn a language. Gordon's system contains a set of rhythm syllables that are easy for students to vocalize and internalize. These syllables represent different rhythmic values and patterns in a way that aligns with natural speech patterns. For example, a quarter note coincides with the syllable “Du,” and eighth notes coincide with “Du-de.”

A central concept in Gordon's Music Learning Theory is "audiation," which is the ability to hear and comprehend music even when no physical sound is present. Gordon states, “Sound itself is not music. Sound becomes music through audiation when, as with language, we translate sounds in our mind and give them meaning. The meaning we give to these sounds will be different depending on the occasion as well as different from meaning given them by another person.”[50] The rhythm syllables help students audiate rhythms, developing their internal sense of timing and rhythm. Thus, students can experience sequential learning, starting with simple patterns and progressing to more complex rhythms.

---

[50] Gordon, *Learning Sequences in Music*, 3.

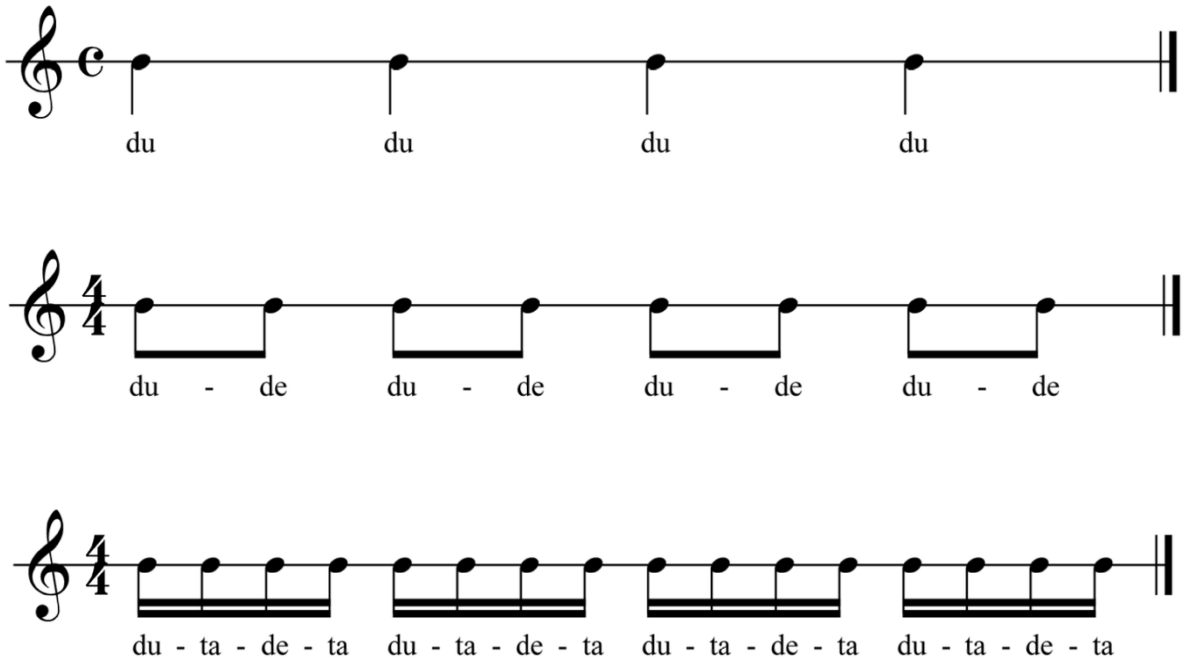


Figure 1. Gordon Rhythm Counting Syllables
Source: Tara Pearsall, "Investigating the relationship between tempo consistency and the rhythm syllable systems used during a standardized rhythm performance task," (Columbia: University of South Carolina ProQuest Dissertations Publishing, 2009), 16-17.

Kodály

Elementary general music teachers quite popularly instill the rhythm counting system developed by Zoltan Kodaly. Gloria Lynn Hill states, "The Kodaly approach to rhythm considers the introduction of each note value as it relates to the development of a child."[51] This is why the breakdown of rhythms for the Kodaly counting system is not complex. The syllables that create this counting system focus on note values rather than how notes relate to others within a measure. For example, all quarter notes are labeled with the syllable "Ta," regardless of whether the quarter note occurs on a downbeat or upbeat. All eighth notes using Kodaly's method are

[51] Hill, "Teaching Rhythm to Beginning Piano Students," 1.

named “ti,” so a group of two eighth notes would be “ti ti.” The syllables are simple and easy to say, so elementary music teachers rely on this system everywhere. This counting method is referred to by Lois Choksy as “rhythm-duration syllables:” having a different syllable for all note lengths.[52] The figure below shows a rhythmic example labeled with syllables using the Kodaly method. Notice the syllables for each note duration to simplify the system and make it developmentally appropriate for elementary school students.

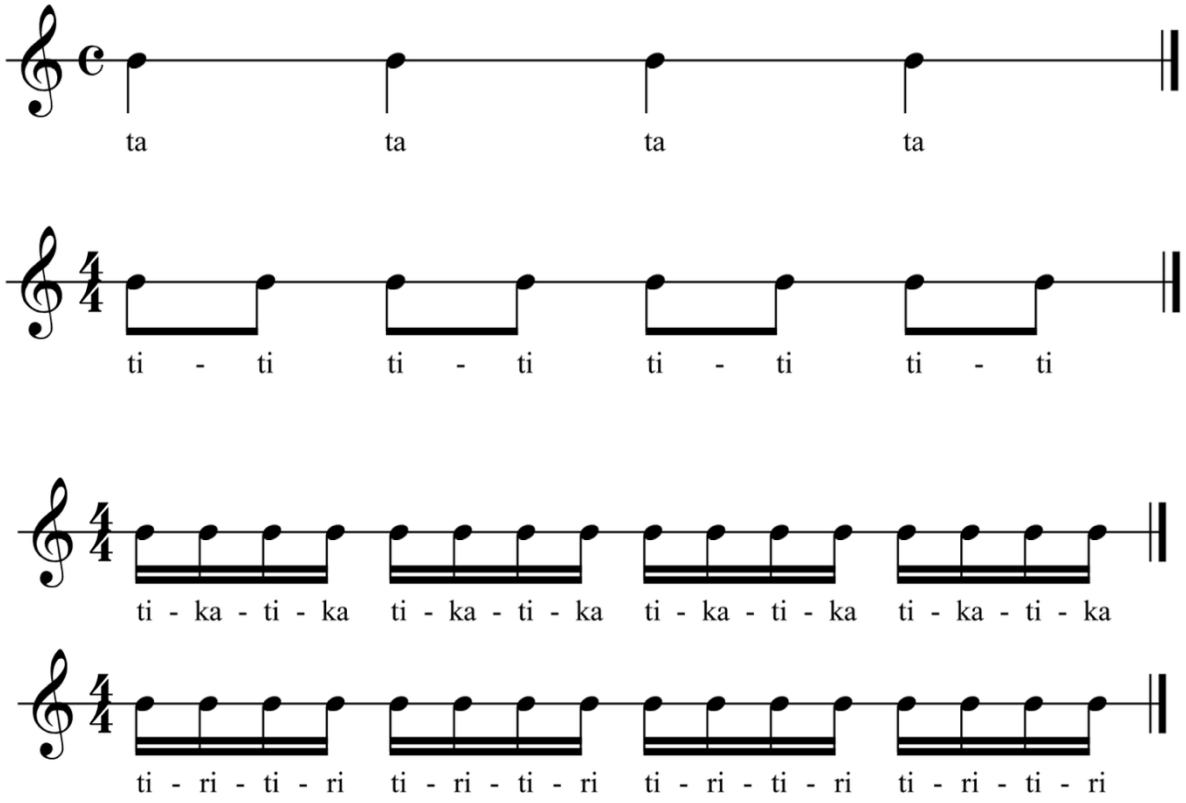


Figure 2. Kodály Rhythm Counting Syllables
Source: Pearsall, “Investigating the relationship between tempo consistency and the rhythm syllable systems used during a standardized rhythm performance task,” 14.

[52] Choksy, *The Kodaly* Method, 19.

Traditional

The Traditional counting system is the most practiced system for instrumental music and is often called the Eastman Counting System. Unlike the first two counting systems discussed above, this system instills numbers on the macrobeats to show specific beat numbers within a measure. While the numbers may help show specific beats for students and make it easier to communicate with the rest of the ensemble simultaneously, this system is not preferred for teaching beginners because it does not translate well to the "sound-to-symbol" approach. Students who still need to understand where beats occur within a measure will have difficulty figuring out how to count rhythms if they do not know what the rhythm should sound like through practice and using simple syllables to call notes. Another criticism of this counting system that may not be conducive to beginning instrumental students is the inconsistency in subdivisions of triplets. There is no way to change how triplets are supposed to sound, but the Traditional counting system consists of three different patterns of syllables to label triplets. This inconsistency can confuse students, and having three different ways to say the same rhythm will lead to a divide within a class because some students may prefer one way and others another.

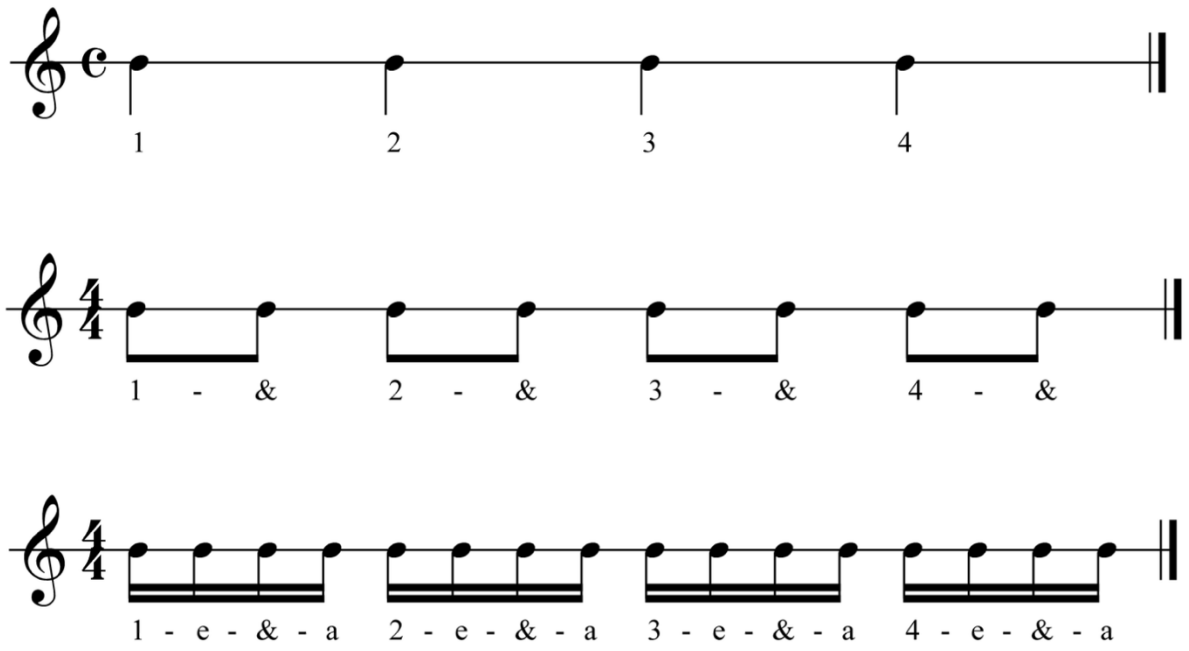


Figure 3. Traditional Rhythm Counting Syllables
Source: Pearsall, "Investigating the relationship between tempo consistency and the rhythm syllable systems used during a standardized rhythm performance task," 12.

This system shows where each beat within a measure falls so students can easily discuss the rhythms of specific beats. However, mixing numbers and symbols within the same counting system may confuse students, and the inconsistencies beyond that will only confuse them more.

Takadimi

Similar to the Kodaly rhythm-counting system is the Takadimi system. Both systems contain the syllable "Ta," but the only difference is that in Takadimi, the word "Ta" always refers to the macrobeat. In contrast, in Kodaly, "Ta" is always meant for quarter notes, regardless of whether the note occurs on a microbeat. Notes on the microbeat for Takadimi instill the syllable "di." This rhythm counting system can be helpful in the classroom since it is beat-oriented rather than notation-oriented. It promotes the "sound-to-symbol" learning method, which allows beginning music students to pick up quickly. Don Ester states the following to explain why a

beat-oriented rhythm counting system would be preferable for students learning to play musical instruments:

> Assigning syllables to specific notation symbols obstructs a sound-to-symbol strategy. For example, the quarter note in 2/4 is aurally experienced exactly like the dotted-quarter note in 6/8 and the half note in 2/2: as the beat. Assigning different syllables to each of these symbols (as in Kodály) seems logical from a notation perspective, but the youngest students who cannot read also don't understand notation…The rhythm syllables translate directly between different meters, so students can see that rhythm remains consistent and syllables line up with one another even in different meters.[53]

The Takadimi syllables are outlined in the figure below:

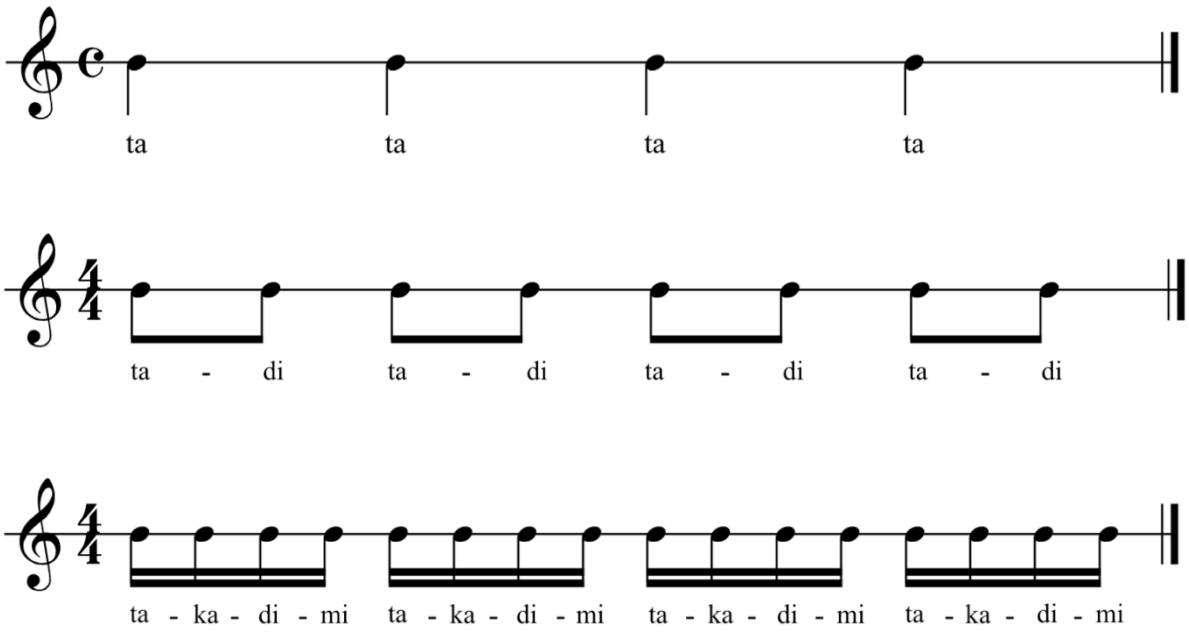


Figure 4. Takadimi Rhythm Counting Syllables

Rhythms sometimes end up sounding the same even though their notation looks different. Feldman and Contzius classify rhythms that contain the same syllables and sound and feel alike but have different notations as enrhythmic.[54] For example, triplets are rhythms that do not

[53] Ester, Scheib, and Inks, "Takadimi," 61.

typically appear in 4/4 time. The first eighth note of the triplet lands on a macrobeat, so the syllable "Ta" represents the first note. In 6/8 time, the group of three eighth notes is a rhythm that commonly occurs in that time signature and is labeled with the syllables "Ta ki da" for each note. Thus, three eighth notes in 4/4 time implement the same syllables for consistency between the rhythms because of how they will sound, although they are both written in different time signatures. This is a feature of the Takadimi rhythm counting system that will help students make the connection from simple to compound meter.

A Comparison of Systems

With so many options in rhythm-counting systems, it can seem overwhelming for teachers to choose one to implement into their instruction. The system's purpose can help teachers and students determine which system may work best for them, depending on their needs and goals. All rhythm-counting systems fall under two classifications depending on their orientation and function: counting-oriented or beat-oriented.

Counting-Oriented Rhythm Systems

These systems, called number systems, utilize numerical representations to denote beat subdivisions within a measure. These systems facilitate the identification of note placement, though they possess inherent limitations. Gordon critiques these systems as primarily time-keeping devices, suitable only for elementary rhythmic patterns typically found in duple meter.[55] While their principal advantage lies in conveying beat functions kinesthetically, a significant drawback is the necessity for learners to comprehend rhythm notation before auditory exposure,

---

[54] Feldman and Contzius, *Instrumental Music Education*, 24.

[55] Edwin E. Gordon, *Rhythm: Contrasting the implications of audiation and notation,* (Chicago: GIA Publications, 2000), 94.

thereby contradicting the pedagogical principle that emphasizes auditory learning preceding visual recognition. Additionally, the cognitive demands of counting, which have no direct correlation to musical aptitude, may impede students with high musical potential but lower general intelligence.[56]

Traditional Counting System

Developed by Harr and published in 1937, this system employs numbers to denote macro beats and syllables “e & a” to indicate the subdivisions of each beat's second, third, and fourth sixteenth notes. The system is grounded in beat function rather than note value, with triplet subdivisions articulated as "tri-po-let." However, as Walters and Taggart noted, its applicability across different meters is limited.[57] Since this system values beat function, the syllables do not directly translate from simple to compound meter. This confuses many due to inconsistencies across the same meter note values.

Eastman Counting System

Developed by McHose and Tibbs in 1944, this methodology utilizes numbers to signify macro beats and syllables to represent subdivisions. Triplets coincide with the syllables "lah-lee," and complex rhythms are integrated into the system. This system is similar to the Traditional counting system in that there are syllables to represent each sixteenth note across one beat. The subdivision syllables for the second, third, and fourth sixteenth notes are “ta te ta.” Having the same syllable for both the second and fourth sixteenth notes can confuse those who choose to implement this system. However, this system may serve well for instrumental students, as the

---

[56] Darrel L. Walters and Cynthia C. Taggart, *Readings in music learning theory*, (Chicago: GIA Publications, 1989), 62.

[57] Ibid., 62.

syllables “ta” and “te” mimic the physical act required for articulation. Despite its versatility, the system needs an understanding of meter before syllables can be applied, thus limiting its initial accessibility, as observed by Hoffman, Pelto, and White.[58]

Beat-Oriented Rhythm Systems

Beat-oriented syllabic rhythm systems emphasize the articulation of beats and their subdivisions through syllables, in contrast to counting-oriented systems, which emphasize numerical counting within a measure. These syllabic systems convey the placement of attacks within beats and sometimes their function within a measure, aligning with kinesthetic musical experiences. Therefore, students learn to perform rhythms by interpreting them one beat at a time instead of deciding where the beat lands in the measure and its purpose. Systems such as Simplified French Time-Names, Takadimi, and those developed by Luther Mason, Galin, Curwen, Gordon, Froseth, and Blaser fall into this category. In contrast, systems like Kodály, Richards, and Sueta necessitate prior knowledge of note values before syllable articulation, thus prioritizing visual recognition over auditory learning.

Takadimi Counting System

The Takadimi system was introduced in 1996 and assigns distinct syllables to each beat subdivision, applicable in simple and compound meters. It enhances rhythmic dictation and the comprehension of syncopation and complex rhythms such as three-against-two. The system underscores the importance of learning rhythmic patterns aurally and orally before associating them with notation. Don Ester elaborates on the importance of a “sound-before-symbol” approach to rhythm pedagogy:

---

[58] Richard Hoffman, William Pelto, and John W. White, “Takadimi: A beat-oriented system of rhythm pedagogy,” *Journal of Music Theory Pedagogy*, (Norman: The Board of Regents, 1996).

> Assigning syllables to specific notation symbols obstructs a sound-to-symbol strategy. For example, the quarter notes in 2/4 is aurally experienced exactly like the dotted quarter note in 6/8 and the half note in 2/2: as the beat. Assigning different syllables to each of these symbols (as in Kodály) seems logical from a notation perspective, but the youngest students who cannot read also don't understand notation. Because students should develop a vocabulary of sounds before reading symbols, and because the purpose of syllables is to link sound to symbol, an effective syllable system must connect most directly with sound.[59]

This approach to rhythm pedagogy seems developmentally appropriate for young students since most begin learning about music and rhythm before they are old enough to decode notation. Thus, they can first experience music and develop a musical vocabulary of sounds, which can be expanded by introducing notation to connect their knowledge of how rhythms sound to how they appear in written text.

The distinctive syllables facilitate phrases' rhythmic dictation in simple and compound meters. These syllables "may be employed for the identification and replication of patterns aurally and orally, subsequently associating notation with sound, as opposed to the Traditional methodology which commences with the complexities of notation."[60] This pedagogical system also applies to intricate scenarios, such as instructing the execution of rhythms involving three against two and four against three.

---

[59] Ester, Scheib, and Inks, "Takadimi," 61.

[60] Hoffman, Pelto, and White, "Takadimi," 15.

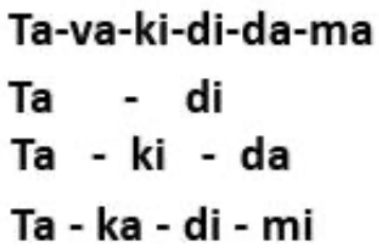


Figure 5. Takadimi Polyrhythms
Source: Brett Allen Janssen, "A Preliminary Comparative Study of Rhythm Systems Employed Within the First-Year College Aural Skills Class," (Manhattan: Kansas State University ProQuest Dissertation & Theses, 2017), 5.

Accurately performing rhythms that include simple and compound meter elements demonstrates a proper understanding of a rhythm's function and mastery of a rhythm-counting system. Although some rhythm systems spell this out differently than others, the goal of understanding the rhythm's function and performing it accurately remains consistent throughout all disciplines of rhythm instruction.

Gordon Counting System

Comparable to Takadimi, Gordon's system, developed by Froseth and Blaser, employs specific vowels to denote beat subdivisions in simple and compound meters. However, it consistently contains "ta" for subdivisions, differing from Takadimi's variable approach. For example, sixteenth notes via the Gordon system coincide with the syllables "du ta de ta." While the first and third sixteenth note syllables remain consistent with eighth notes, labeling the second and fourth sixteenth notes with the same syllable may confuse students and create a lack of consistency and understanding of subdivisions of beats. However, both of the "ta's" in this system serve the same function, which may greatly help students in the performance aspect of learning rhythms because using the same syllable in two areas of a rhythm that serve the same function will cause students to think of them similarly and perform them evenly without any

change in tempo. This system supports kinesthetic rhythm learning and significantly influenced the adoption of the Takadimi system for further study.[61]

Kodály Counting System

In this system, the syllable for a quarter note is "ta," two eighth notes are "ti-ti," and sixteenth notes in simple meter are "ti-ri-ti-ri" or "ti-ka-ti-ka." Triplets are "syn-copa," whereas sixteenth notes in compound meter are "ti-ka-ti-ka-ti-ka." There is a consistency across meters in syllables for note duration. For example, all sixteenth notes are labeled “ti ka ti ka” in simple and compound meters. Nevertheless, this solfege approach lacks generalizability across different meters because the sixteenth notes serve various functions from simple to compound meter.

Furthermore, the mnemonic "syn-copa" for triplets is inconsistent with the rest of the system. Moreover, this methodology receives criticism for not addressing the complex rhythms typically encountered in higher education music courses.[62] The assignment of syllables to note values regardless of meter or context fails to effectively communicate the beat’s function to students, complicating the reading of rhythms in compound and changing meters.[63]

The Unimportance of Bar Lines and Meter

James Byo’s 1992 study investigates the impact of barlines, pitch, and meter on musicians' rhythm reading performance. Previous research indicated conflicting views on the value of barlines in facilitating rhythm reading. The study manipulated these variables in music excerpts and assessed their effects on rhythm performance.

---

[61] Joshau Palkki, “Rhythm syllable pedagogy: A historical journey to takadimi via the Kodály method,” *Journal of Music Theory Pedagogy*, (Nashville: Carolyn Wilson Digital Collections, 2010).

[62] Hoffman, Pelto, and White, “Takadimi.”

[63] Palkki, “Rhythm syllable pedagogy.”

The subjects were undergraduate and graduate instrumental music majors. They performed rhythmically equivalent excerpts with and without barlines, varied meter, and pitch. The selected excerpts are from etudes to ensure real music context. Results showed that changing meter excerpts without barlines resulted in better rhythmic accuracy, challenging conventional notions about the necessity of barlines in music notation. Byo discusses a potential reason for his discoveries:

> Without the visual cues provided by barlines and meter signatures, musicians may have been induced to make more consistent use of the subdivision fosters accuracy in rhythm as shown in research by Major (1982) and Drake (1968), this may explain in part a preponderance of high rhythm scores for bar-less, changing meter excerpts. Presumably, subjects were not able to visually arrange rhythm groups (at least not in the manner of measured music). This may have created a perceived need to mentally subdivide the beat, resulting in a longer line approach to rhythm reading. In effect, rhythmic security may have been provided by the subdivision technique. Alternatively, rhythm may have been perceived more literally in the absence of barlines and implied accent patterns.[64]

Students may see challenging meters in music as a hindrance, resulting in them failing to perform the rhythms accurately. However, as Byo's study shows, if students focus solely on the rhythm and subdivisions of macrobeats and microbeats (which can significantly be enhanced by rhythm counting systems), students will have more success in performing rhythms accurately. This study contributes to the ongoing discussion on the effectiveness of notational elements in music performance and provides valuable insights for music educators and performers.

Related Literature

Implementing Rhythm-Counting Systems with A Purpose

Tara Pearsall conducted a study from the South Carolina Arts Assessment Program (SCAAP), which administered an entry-level music assessment in 2007. Pearsall's purpose was to find a rhythm-counting system that would best address a widespread rhythm performance

---

[64] Byo, "Effects of Barlines, Pitch, and Meter," 40-41.

deficiency experienced by most students: the steadiness of tempi when performing rhythm. Pearsall criticizes the ambiguity of previous rhythm studies:

> In general, the researchers from previous rhythm syllable system efficacy studies emphasized multiple elements of rhythm when measuring students' rhythm performance achievement. Measuring multiple elements of rhythm simultaneously has produced findings that are inconclusive and offer little practical significance in terms of rhythm pedagogy… By focusing exclusively on tempo consistency when measuring students' rhythm performance achievement, researchers might begin to understand how, or if, students' rhythm achievement differs with regard to the type of rhythm syllable systems they use.[65]

Pearsall designed her study around one of the most frequent rhythm performance mistakes among young instrumental students. However, while her research may have found the most effective rhythm-counting system to implement in teaching students to perform at a consistent tempo, there are several other aspects of rhythm that students may need to perform more accurately. Thus, there is a need for additional studies on rhythm-counting systems for other specific elements of rhythm performance. Students have various needs and methods of comprehension, which may call for the supplementation of a different rhythm-counting system from the one that most effectively teaches students to perform at a steady tempo.

The study utilizes recorded performance task sound files from the SCAAP Rhythm Performance Task and the rhythm criterion scores assigned to those performances by SCAAP raters. A stratified random sample of 104 fourth-grade students from twenty-eight elementary schools in South Carolina participated in the study from a population of approximately 3,500 students. The schools in South Carolina employed three different rhythm syllable systems: Kodály to forty-eighth schools, Traditional to twenty-six schools, and Gordon to five schools.

---

[65] Tara Pearsall, "Investigating the relationship between tempo consistency and the rhythm syllable systems used during a standardized rhythm performance task," (Columbia: University of South Carolina ProQuest Dissertations Publishing, 2009), 5-6.

Approximately thirty-five students were selected for each rhythm syllable system to ensure adequate representation and minimize potential teacher effects. This resulted in thirty-five students from sixteen schools for Kodály, thirty-five from eight Traditional schools, and thirty-four students from four schools for Gordon.

The tempo consistency of students' performances is measured via computerized speech lab software. This system processes and analyzes the acoustic parameters of the recorded performances, focusing on energy (dB) and time (seconds). This thorough methodology ensured a robust analysis of the relationship between rhythm syllable systems, tempo consistency, and overall rhythm achievement in fourth-grade students. The Traditional counting-system group had the highest mean Macrobeat Jitter Ratio (MJR), indicating less tempo consistency than the Kodály and Gordon groups. The Gordon group had the lowest mean MJR, suggesting the highest tempo consistency. The results show significant differences between the Traditional system and both Kodály and Gordon systems ($p < .001$), with large effect sizes (Cohen's $d > 1.0$). The data show no significant difference between Kodály and Gordon systems.

The findings indicate that students using the Kodály or Gordon systems demonstrated greater tempo consistency than those using the Traditional system. The data show no difference between the Kodály and Gordon systems. The continuity of consonant sounds in Kodály and Gordon systems may contribute to this increased consistency. Additionally, these systems are part of comprehensive pedagogical approaches, possibly leading to more effective teaching methods than the Traditional system. Pearsall states, "When tempo consistency was measured objectively and in isolation… the investigator concluded that the Kodály and Gordon systems are substantially more effective than the [Traditional] system for developing students' ability to

perform with consistent tempo."[66] The study found that the choice of rhythm syllable system significantly affects students' tempo consistency, with Kodály and Gordon's systems leading to better outcomes. However, subjective evaluations of rhythm achievement do not strongly correlate with objective measures of tempo consistency. This underscores the importance of considering multiple assessment methods in music education to understand students' rhythmic abilities comprehensively.

Student Engagement is Critical

In 2006, Tammy Fust compared the efficacy of two rhythmic syllable systems, Traditional and Takadimi, in teaching beginning music students. It aims to understand how students perceive and reproduce rhythms using these systems. The study subjects were four sixth-grade band students chosen based on familiarity with music notation and instrument proficiency. In addition to evaluating performance efficacy through the different rhythm-counting systems, Fust also interviewed the students regarding their perception of learning with the rhythm-counting system and discussed their challenges in understanding the rhythms. Students' mistakes in their rhythm assessments are classified into different rhythm-performance-specific criteria.

Each of the four students received one-on-one lessons for thirty minutes each week, focusing specifically on rhythm instruction supplemented by one of the two rhythm-counting systems implemented in the study. In her early weeks of instruction, Fust noticed that students were shy and reluctant to perform rhythms on their instruments by themselves. To help build their confidence, Fust frequently provided students with specific rhythm instruction, allowing them to clap rhythms and count them out loud before playing them on their instruments.

---

[66] Pearsall, "Investigating the relationship," 63.

Results indicated that both rhythm-counting systems were equally effective in improving student rhythm performance. Fust states, "Overall, students from both groups achieved the same skills in rhythmic accuracy throughout the study, regardless of syllable system. Both pairs of students showed progress in proficiently counting rhythms as the lessons progressed."[67] This indicates that the rhythm-counting systems teachers implement in their instruction may be their choice since several can foster effective student results. However, teachers should welcome experimenting with different systems and finding the one that works best for them and their students, regardless of whether students began their musical journey with a different rhythm-counting system. Fust states, "It was surprising to note how quickly the two students learned to count using 'Takadimi' syllables with quarter and eighth notes."[68] As long as students are excited and eager to learn, they can have rhythmic success using either of these rhythm-counting systems with proper instruction. According to Fust, students will adapt to rhythm syllables they may not be familiar with when first learning them. Thus, teachers must venture out and experiment with other methods to find the one that will foster the best results and one in which they enjoy teaching their students and can get them excited and eager to learn to play music.

Rhythm-Counting Systems Guiding Instruction

An international study conducted by A.K. Khor, C.J. Chan, and S. Roslan in Malaysia in 2016 was a band-specific study that tied the elements of rhythmic accuracy and instrument articulation together. The study employed an experimental design, which included pre-tests, a five-week intervention period, and post-tests to evaluate the effectiveness of three different rhythm learning methods on rhythm accuracy and articulation clarity among secondary school

---

[67] Fust, "Syllable Systems," 33.

[68] Ibid., 31.

trumpet students. The participants were divided into three groups: Group One was the control group, using the conventional Traditional counting method; Group Two, using the Kodály syllable system; and Group Three, using an adapted syllable system based on the Takadimi Counting System. Khor, Chan, and Roslan address their reasoning for adapting their rhythm syllable system for this study:

> Besides Kodaly's, the Takadimi system devised by Hoffman, Pelto, and White also contains features that are coherent to the tonguing drills…The Takdimi system uses 'ta-ka-di-mi' for the semiquavers' group. The consonants /t/ and /k/ are useful in tonguing drills as mentioned. However, the second half of the syllables 'di-mi' does not have any relation to tonguing drills. Thus, the adaptation for this system has been made for the purpose of this research, to compare the integration effect of rhythm learning and tonguing drills.[69]

All participants were secondary school students learning the trumpet for several months. Khor, Chan, and Roslan state, "Homogeneity of the respondents' instrumental ability is shown through the pre-test result. All respondents were secondary school students who had begun with trumpet for several months and have merely done buzzing."[70] They maintain a basic understanding of how to form a proper trumpet embouchure and articulate notes but do not maintain much experience with decoding and counting various rhythms on which the study focuses.

The intervention lasted five weeks, with a forty-minute lesson each week. The content for the lessons included various rhythm patterns, which progressed weekly in difficulty and complexity. The assessments are split into two parts: sight playing tests, which included twelve questions with six to eight-beat rhythmic patterns to evaluate rhythm accuracy and articulation clarity simultaneously, and rhythm-specific tests, which were separate assessments for rhythm

---

[69] A.K. Khor, C.J. Chan, and S. Roslan, "Integrating Rhythmic Syllable with Tonguing Drills in Elementary Brass Instruments Instruction," *Pertanika Journals.* (Serdang: Universiti Putra Malaysia Press, 2016), 1384.

[70] Khor, Chan, and Roslan, "Integrating Rhythmic Syllable," 1388.

accuracy consisting of one-bar rhythm patterns shown on flashcards and articulation clarity in which students played notes at tempos of sixty, ninety, and 120 beats per minute.

The results from the MANOVA analysis showed significant differences among the groups regarding rhythm accuracy and articulation clarity. Results from the study revealed that using syllable systems for rhythm learning significantly improved rhythm accuracy and articulation clarity compared to the conventional method. The adapted syllable system utilized by group three showed the highest performance, likely due to the consistent implementation of 'ta' for macro beats, simpler and more pronounceable syllables, and integrated consonants for tonguing drills. The researchers state the following regarding the results:

> The result revealed that trumpet students who learn rhythm patterns using syllable systems performed better than those who learned in conventional way. The metric counting of '1e&a' used in the conventional teaching, which is based on the cognitive process of mathematical thinking, was found to be more time consuming. The verbalisation of symbols contained in syllable systems had assisted students in recognising rhythm patterns through sound reference. The process of decoding musical notes happened smoother by transferring the symbols into sound assisted by inner hearing compared with by transferring the symbols into mathematical values. The syllable system enables the rhythmic pattern learned to be heard internally, and to be recalled and played back in future applications.[71]

The study suggests that integrating rhythm syllables with tonguing drills can enhance the efficiency and effectiveness of music instruction. It highlights the potential for localized adaptations of syllable systems to meet specific instrumental needs, reducing redundancies in learning processes and enabling a more holistic approach to music education. The adapted rhythm syllable system proved to be an effective method for improving rhythm accuracy and articulation clarity in elementary brass instruction. This system not only defines rhythm subdivisions that make rhythms easier to visualize for students but also mimics the physical

---

[71] Khor, Chan, and Roslan, "Integrating Rhythmic Syllable," 1391.

motions in the embouchure to articulate notes when playing trumpet properly. Thus, the adapted rhythm system fostered the most substantial results due to its integration and relatability to performing rhythms in addition to conceptualization. The study encourages further research and development of integrated and localized teaching methods in music education to enhance learning outcomes.

Rhythm-Counting Systems for All Ages

Brett Allen Janssen's 2017 study investigates the impact of different rhythm systems on rhythm pattern performance in introductory aural skills classrooms at three Midwest colleges. The rhythm systems analyzed include Takadimi, Traditional, and Eastman. The Eastman counting system consists of subdividing syllables: "1-ta-te-ta." These systems vary in their approach to conveying rhythm, with some focusing on beat placement and others on attack within beats. The primary goal is to determine if there are significant differences in rhythm pattern achievement among students taught with different rhythm systems. Additionally, the study examines whether students' aptitude, as measured by the Advanced Measures of Music Audiation (AMMA), influences their achievement.

The study employed a pretest-posttest quasi-experimental design involving twenty-seven students from three Midwest colleges. Janssen states, "The students were predominantly Caucasian and freshmen (both 81.4%) and 18 years of age (74%). Female participants (63%) outnumbered male participants (37%) by almost a 2 to 1 ratio. Students who reported an experience performing on both an instrument and voice represented the highest category of musical experience (37%)."[72] The participants were divided based on the rhythm system instilled

[72] Brett Allen Janssen, "A Preliminary Comparative Study of Rhythm Systems Employed Within the First-Year College Aural Skills Class," (Manhattan: Kansas State University ProQuest Dissertation & Theses, 2017), 38.

in their respective aural skills courses. One college instructed with Takadimi, another with Traditional, and the third with Eastman. To establish a baseline for rhythmic competency, students completed the AMMA and a researcher-designed pretest, which included rhythm patterns from the "Music for Sight Singing" textbook. Over eight weeks, students received rhythm instruction tailored to their respective rhythm systems. Instruction included rhythm echoing, connecting sound to symbols, and melodic reading exercises. After the eight-week instructional period, students took a posttest like the pretest, using the same rhythm systems taught in class. Janssen evaluates rhythm pattern performances based on correctly chanted macrobeats and correct syllable usage.

The analysis focused on pretest-posttest gain scores to determine improvement. Janssen compares performance differences among these groups across different rhythm systems to ascertain whether a particular system was more effective for certain aptitude levels. The Takadimi system showed the most growth across straightforward, compound, and combined rhythm patterns, with gains of 244%, 780%, and 436%, respectively. The Traditional system demonstrated substantial gains, with 71% for simple, 56% for compound, and 65% for combined rhythm patterns. The Eastman system exhibited the most minor growth, with gains of 20% for simple, 17% for compound, and 19% for combined rhythm patterns.

While all groups showed improvement from pretest to posttest, the results did not demonstrate a statistically significant difference in rhythm achievement attributable to any specific rhythm system. Similarly, the data shows no significant difference between low and high-aptitude students across the different rhythm systems. Janssen noted the following regarding the results of his study:

> Each of the three aural skills classes began with different levels of competency but by the end of the study, each of the classes scored closely together…This indicates that

> regardless of the competency level at the beginning of a course, students can achieve at the level determined by the learning objectives and curriculum by the end of the course. Students' improvements in rhythm reading indicate that progress and achievement can be independent of using any of the three rhythm systems.[73]

The study implies that various rhythm systems can improve rhythmic literacy. Still, more extensive research with larger sample sizes and advanced statistical methods is needed to draw definitive conclusions about the effectiveness of specific rhythm systems in different learning contexts and among students with varying aptitude levels. While beginner music students must have their rhythm learning supplemented by a rhythm-counting system that will set them up for success, this study emphasized that students of all ages can benefit from the implementation of a rhythm-counting system that effectively shows subdivisions of beats to make them more understandable and more accessible to perform.

Rhythm-Counting Systems Are Not Just for Rhythm

Kathleen Ann Bader conducted a study in 2014 on high school choirs that compared the effectiveness of teaching methods using folk songs and the Takadimi system versus Traditional methods where parts are taught by rote with piano or director's singing. The study involved high school students from a suburban rural high school characterized by high economic diversity but low cultural diversity. The two choirs comprised high school students aged fourteen to eighteen. One choir director teaches solfege via folk songs and trains in the Takadimi rhythmic reading system. The other choir consists of parts taught by the director, who sings or plays on the piano until the choir can sing their parts. Instruction included eight weeks of daily choir classes.

Results from the study show that the choir using folk songs and the Takadimi method showed significant improvement in rhythmic and melodic sight-singing abilities compared to the

---

[73] Janssen, "A Preliminary Comparative Study of Rhythm Systems," 62-63.

other choir, which relied on Traditional rote learning methods. Bader states the following regarding the results:

> Choir X learned to sight-read successfully to within 80% accuracy of both pitches and rhythms. Choir Y showed no change in their abilities to sight-read using aural modeling on both the piano and voice. Choir X showed far greater retention of melodies learned using solfege and Takadimi, while Choir Y had to have melodies modeled many times before successful repetition or memorization occurred.[74]

The Takadimi rhythm-counting system supplemented Choir X's instruction. By providing syllables to accompany subdivisions of beats and giving students something to relate the rhythms of the folk songs to, students were more effectively able to comprehend and remember several musical aspects of the folk songs. The study shows that students not only remembered and performed the rhythm of the songs more accurately but also better remembered the correct pitches of the melodies in addition to the rhythms. Implementing a rhythm-counting system to associate with rhythm accentuates the ability of students to conceptualize new material when they have visual and aural aids to supplement their instruction. Bader makes the following conclusions from her study:

> Sight-singing is tantamount to good musicianship for a choir. Instrumentalists must learn to read written musical notation in order to convert the written notation to the correct fingering of their instrument to produce the expected sound. Vocalists do not finger their instrument. Therefore, they must have a way to internalize pitches and rhythms for successful reproduction of written musical notation. A system of rhythmic and melodic reading must be part of any successful choir. It is through these systems that the vocalist, and then choirs, can learn and perform written music without the need for constant aural re-modeling.[75]

---

[74] Kathleen Ann Bader, "The Effects of the Takadimi Rhythm Method and Folk Songs on the Sight-Reading Abilities of Two High School Choirs," (Manitowoc: Silver Lake College ProQuest Dissertation & Theses, 2014), 30.

[75] Ibid., 30-31.

The structured and systematic approach of Takadimi and solfege facilitated better internalization and understanding of musical concepts among the students in this choir, highlighting the efficacy of these methods in enhancing sight-singing skills in high school choirs. Bader highlights that rhythm-counting systems enhance students' overall musicianship and develop other musical qualities beyond rhythm comprehension.

Method Book Analysis

In instrumental music education, method books represent pivotal resources frequently integrated into pedagogical frameworks by music instructors. These texts, characterized by their diverse authorship, often involve collaborations between composers and experts in instrumental music education. This collaboration ensures that method books are crafted with a deep understanding of musical composition and effective teaching methodologies, enhancing their utility in educational settings. Bacon states, “It is important to examine some of the materials available for the beginning band to understand how concepts of rhythm present themselves. These method books either allude to or incorporate some form of ‘1 e + a’ to count rhythm. This is known as the Traditional method of rhythm instruction.”[76] The prevalence of the Traditional Counting System in most method books underscores a consensus among composers and instrumental music pedagogical experts regarding its efficacy in fostering rhythmic proficiency among students. This system, characterized by its subdivision of beats into "1 e + a," is widely embraced for its clarity and comprehensibility in conveying rhythmic concepts to learners, laying a robust foundation for their musical development.

The homogeneity observed across most method books, except the Breeze-Easy and Rubank series, merits consideration. This uniformity enables seamless integration of these texts

---

[76] Bacon, “A comparison of rhythm syllable systems,” 6-7.

into large ensemble settings, as each exercise remains consistent across different instrument books. Thus, the method books facilitate cohesive group instruction and rehearsals, enhancing efficiency and coherence within ensemble contexts. Conversely, the heterogeneity in the Breeze-Easy and Rubank Method books necessitates a more nuanced approach to ensemble instruction. These texts feature instrument-specific exercises tailored to the unique developmental needs of individual players. Consequently, their integration into large ensemble settings poses logistical challenges, as the divergence in exercise content impedes uniform group practice and performance.

The excerpts from the most popular method books offer tangible examples of the Traditional rhythm counting system in action, demonstrating its application in facilitating rhythmic comprehension and mastery among students. Educators can effectively scaffold students' understanding of rhythm through these methodological resources, fostering musical proficiency and artistic expression within their instructional contexts.

Accent on Achievement

This comprehensive band method book by John O'Reilly and Mark Williams is a testament to their esteemed reputation as prolific composers for their contributions to the musical development of young performing ensembles. This pedagogical resource meticulously instills foundational musicianship skills in students while nurturing their creativity through interactive exercises. The book's pedagogical approach extends beyond Traditional instruction, providing students with opportunities for orchestration, composition, and improvisation, fostering a holistic understanding and appreciation of music.

A distinguishing feature of this method book is its vibrant and engaging presentation, characterized by a visually stimulating layout replete with a diverse palette of colors and

typographical elements. This aesthetic enhancement underscores and elucidates vital musical concepts, enriching the learning experience for students and facilitating their comprehension and retention of material.

The Traditional counting system for rhythm instruction is central to this method book's instructional framework. This system embodies a structured approach to rhythmic subdivision, wherein beats are delineated as "1 e + a." By employing this established rhythmic framework, the authors ensure consistency and clarity in rhythm instruction, enabling students to develop a solid rhythmic foundation essential for musical proficiency and expression.

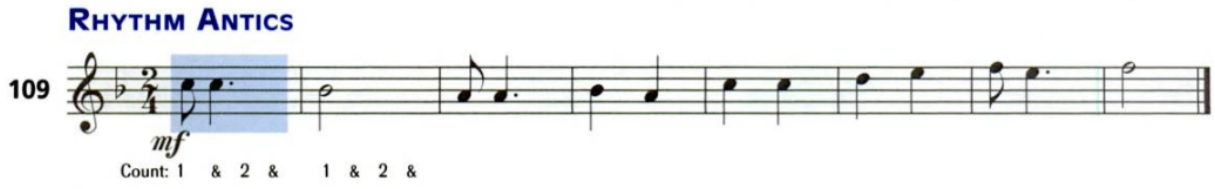


Figure 6. Accent on Achievement, Flute Book 1
Source: John O'Reilly and Mark Williams, *Accent on Achievement: A comprehensive band method that develops creativity and musicianship,* (Van Nuys: Alfred Publishing Company, 1997), 28.

Breeze-Easy Method

The Breeze-Easy Method books, conceived through the collaborative efforts of music educators John Kinyon and Valentine Anzalone, represent a distinctive departure from the homogenous approach typically found in band method book sets. These instrumental method books meticulously cater to programs needing frequent opportunities for extensive ensemble rehearsals. Unlike their homogenous counterparts, each book in the Breeze-Easy series is instrument-specific and tailored to individual instrumentalists' unique requirements and developmental trajectories.

The pedagogical philosophy behind the Breeze-Easy Method books is rooted in facilitating effective instruction within smaller lesson groups of students playing the same instrument. This tailored approach enables focused and targeted instruction, maximizing students' learning outcomes. The repertoire included in these books is characterized by its accessibility and enjoyment, ensuring student engagement and motivation throughout the learning process.

The etudes throughout the text are integral to the instructional design of the Breeze-Easy series. These exercises are invaluable tools for reinforcing newly introduced concepts, allowing students to demonstrate skill consolidation and refinement. Such pedagogical scaffolding enhances the efficacy of the instructional material, fostering a comprehensive and systematic approach to musical development.

The Breeze-Easy Method books allude to the Traditional counting system, underscoring the authors' commitment to pedagogical coherence and consistency. This rhythmic framework, exemplified in the excerpt from the tuba book, facilitates rhythmic comprehension and precision, equipping students with essential musical proficiency and expression skills.

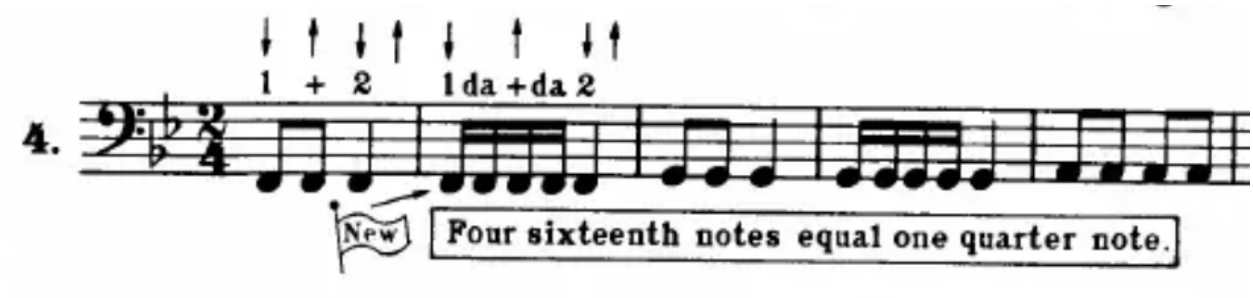


Figure 7. Breeze-Easy Method, Tuba Book 2
Source: John Kinyon and Valentine Anzalone, *Breeze Easy Method 2: Tuba,* (New York: Warner Bros. Inc., 1983), 5.

Essential Elements

The Essential Elements book series is an exemplary cornerstone of comprehensive method books, enjoying widespread adoption across music education. These texts are the collaborative product of a committee of esteemed music educators and pedagogical experts, ensuring a rich synthesis of instructional expertise and pedagogical insight.

A distinctive factor of the Essential Elements series is its homogenous structure, which offers uniform instructional content across different instrument books. However, this uniformity is augmented by exercises tailored to specific instrumental skills, catering to individual instruments' unique needs and developmental trajectories. This nuanced approach ensures a comprehensive and tailored learning experience for students across diverse instrumental disciplines.

An innovative feature distinguishing Essential Elements is its pioneering inclusion of accompanying compact discs. These audio resources allow students to engage in interactive practice sessions, playing along with recorded performances from the comfort of their own homes. This interactive dimension enhances student engagement and provides invaluable performance opportunities that contribute significantly to their musical development and proficiency.

Central to Essential Elements' instructional framework is utilizing the Traditional counting system, exemplified in the excerpt from the second book in the trombone series. This rhythmic framework, characterized by its subdivision of beats into "1 e + a," is a foundational tool for facilitating rhythmic comprehension and precision among students. By employing this established rhythmic method, Essential Elements ensures consistency and clarity in rhythm

instruction, empowering students to cultivate essential rhythmic skills integral to performance accuracy.

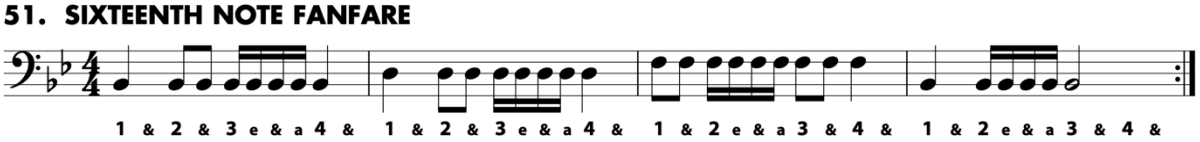


Figure 8. Essential Elements, Trombone Book 2
Source: Tim Lautzenheiser, John Higgins, Charles Menghini, Paul Lavendar, Tom C. Rhodes and Don Bierschenk, *Essential Elements 2000: Comprehensive Band Method*, (Milwaukee: Hal Leonard Corporation, 2004), 11.

Measures of Success

The Measures of Success band method book series is a prominent comprehensive instructional resource celebrated for its efficacy in cultivating musical proficiency among developing instrumentalists. A distinguishing aspect of this series is its collaboration among a team of esteemed composers, representing a convergence of prolific talent and pedagogical expertise. Spearheaded by the Frank J. Hackinson (FJH) Music Company, a renowned publisher of quality band music, the Measures of Success series boasts contributions from esteemed composers Brian Balmages, Timothy Loest, and Robert Sheldon. These composers, recognized for their prolific and influential contributions to the field of band repertoire, have collectively crafted a pedagogically sound curriculum enriched by quality exercises tailored to the developmental needs of instrumental students.

The Measures of Success series aims to foster musical growth and proficiency through engagement with high-quality repertoire. Including compositions by these esteemed composers ensures student exposure to musically enriching experiences that enhance technical skills and nurture artistic expression and appreciation.

In line with pedagogical best practices, the Measures of Success series employs the Traditional counting system to facilitate rhythmic comprehension and precision among young band students. This rhythmic framework, exemplified in the provided example from the teacher's manual of the first book in the series, is a foundational tool for cultivating rhythmic fluency and musicality.

Furthermore, the integration of accompanying compact discs underscores the series' commitment to providing students with ample performance opportunities. These audio resources enable students to engage in interactive practice sessions, playing along with recorded performances that enhance their ensemble skills and musical sensitivity.

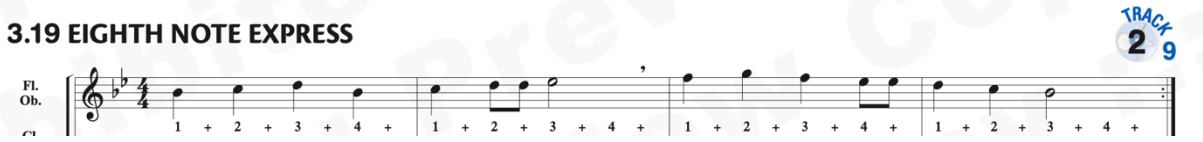


Figure 9. Measures of Success, Teacher's Manual, Book 1
Source: Deborah A. Sheldon, Brian Balmages, Timothy Loest, Robert Sheldon and David Collier, *Measures of Success: A Comprehensive Musicianship Band Method,* (Fort Lauderdale: The FJH Music Company Inc., 2010), 130.

Rubank Method

The Rubank series of method books is known for its effectiveness in individual or small group instruction across various musical instruments. These texts are heterogeneous and cater to specific instruments, featuring an array of exercises meticulously designed to cultivate essential techniques necessary for progression. Experts with a profound understanding of music education pedagogy and specialized knowledge of the respective instrument author each volume within the series.

Fundamental exercises encompassing scales, technical drills, and melodic etudes are central to the Rubank series' instructional approach. These exercises foster the development of a

robust tone and technique. This pedagogical framework is conducive to small-group settings where students share a standard instrument, facilitating collaborative learning and skill refinement.

Moreover, including the Traditional counting system within exercises serves to fortify rhythmic comprehension and proficiency, a hallmark feature shared with other notable method books. An illustrative example from the elementary saxophone method book underscores this pedagogical convention's integration, further enhancing students' rhythmic acuity and overall musical fluency.

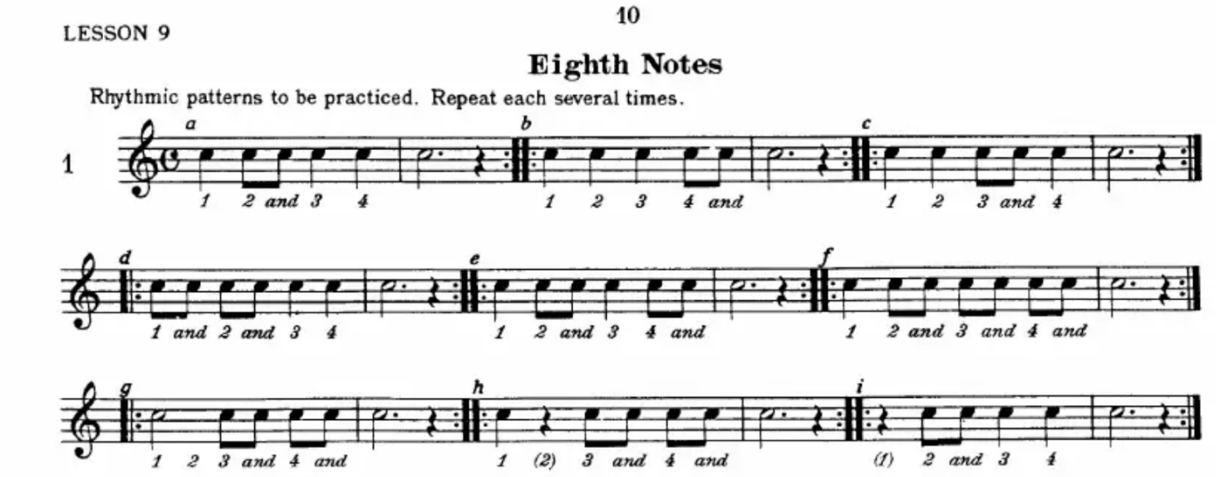


Figure 10. Rubank Elementary Method, Saxophone
Source: Nilo M. Hovey, *Rubank Elementary Method Saxophone,* (Chicago: Rubank Inc., 1934), 10.

Sound Innovations

This method book series exemplifies a collaborative effort between esteemed figures in music education pedagogy and accomplished composers specializing in young ensemble music. Robert Sheldon, renowned for his globally performed compositions; Peter Boonshaft, a distinguished college professor revered for his dynamic teaching methods and prolific authorship; Dave Black, a percussion luminary whose acclaimed "Alfred's Drum Method" enjoys

widespread adoption; Bob Phillips, an esteemed orchestral music education expert and former president of the American String Teachers Association, and Chris Bernotas, celebrated for his innovative approach to composition, collectively contribute their expertise to this venture.

This collaborative committee brings together a diverse range of perspectives and experiences within the field of music education, resulting in a method book series designed to instill excitement and enthusiasm in students as they embark on their musical journey. Like other homogeneous method book series, this collection provides comprehensive instruction that facilitates collective learning in large ensemble settings while nurturing the development of instrument-specific skills necessary for individual advancement.

Integrating the Traditional counting method within the Sound Innovations series is a pedagogical tool for reinforcing rhythmic comprehension and precision. Exercises within this series demonstrate this approach, such as the rhythmic counting in the first book for trumpet, where the Traditional counting system for eighth notes supplements quarter notes and half notes, ensuring a holistic approach to rhythmic development within musical passages.

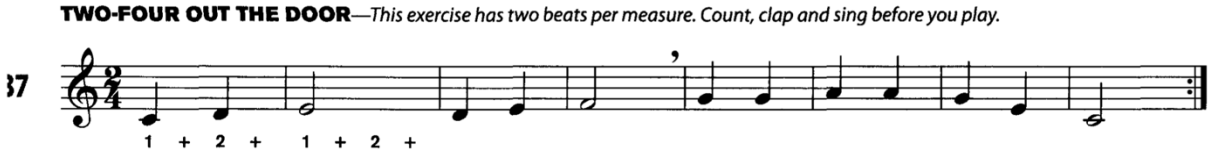


Figure 11. Sound Innovations for Concert Band Book 1, Trumpet
Source: Robert Sheldon, Peter Boonshaft, Dave Black and Bob Phillips, *Sound Innovations for Concert Band Book 1, Trumpet,* (Van Nuys: Alfred Music Publishing, 2010), 11.

Standard of Excellence

The Standard of Excellence series is one of the most widely embraced band method books, renowned for its comprehensive approach across three volumes. Authored by the esteemed Bruce Pearson, an internationally recognized music educator and clinician, these texts

embody a performance-centered pedagogy with a multifaceted emphasis on music theory, history, ear training, listening skills, composition, improvisation, and interdisciplinary and multicultural studies.

Distinguishing from other comprehensive band method books, the Standard of Excellence series does not contain a prescribed rhythm-counting system. Instead, Pearson's approach encourages flexibility, allowing music educators to integrate their preferred rhythm-counting methodologies to supplement instruction. While exercises prompt students to notate rhythmic counts, the absence of a standardized system within the series may necessitate educators to personally guide students in rhythm interpretation.

While some may perceive the lack of a predefined rhythm-counting system as a potential drawback, Pearson's approach allows educators to tailor instruction according to their pedagogical preferences. While a structured system may offer clarity, the absence fosters an environment wherein educators can exercise creativity and adaptability in teaching rhythm and rhythmic counting, aligning with diverse learning styles and instructional methodologies. Thus, the Standard of Excellence series remains a versatile resource, empowering educators to facilitate comprehensive musical development in their students while honoring the richness of pedagogical diversity within the music education community.

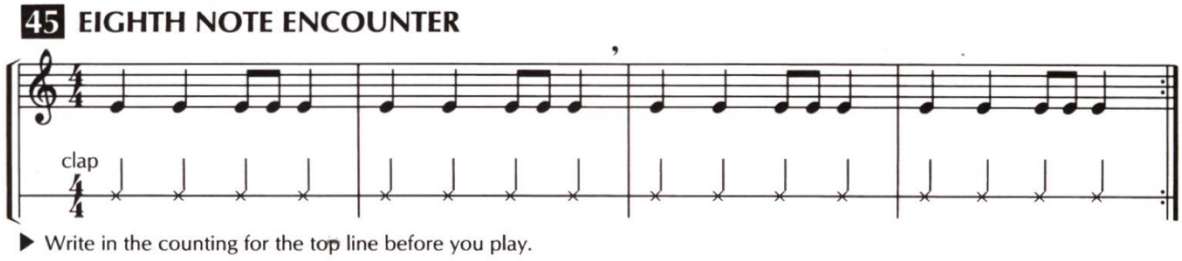


Figure 12. Standard of Excellence Book 1, Trumpet
Source: Bruce Pearson, *Standard of Excellence Comprehensive Band Method: Book 1- Trumpet,* (San Diego: Neil A. Kjos Music Company, 1993), 13.

Yamaha Band Student

The Yamaha Band Student method books represent a homogeneous series crafted to facilitate significant and small-group instruction, offering a robust resource for young band students. Authored by Sandy Feldstein, a prominent figure in music education, and John O'Reilly, a prolific composer renowned for his contributions to young band repertoire, this series fosters and cultivates performance skills among students.

These method books contain engaging musical selections, including songs, duets, trios, and full-band arrangements. These captivate students' interest while guiding them through acquiring and refining essential performance techniques on their respective instruments. Incorporating the Traditional counting system throughout the series is a foundational tool to aid students in rhythm counting and performance.

Students can discern the relationships between different note lengths by presenting precise subdivisions of quarter and half notes and applying this understanding to their performance interpretations. Whether utilized in large ensemble settings or smaller group contexts, the Yamaha Band Student method books offer students critical performance opportunities, fostering musical growth and enjoyment through an accessible and enriching repertoire.

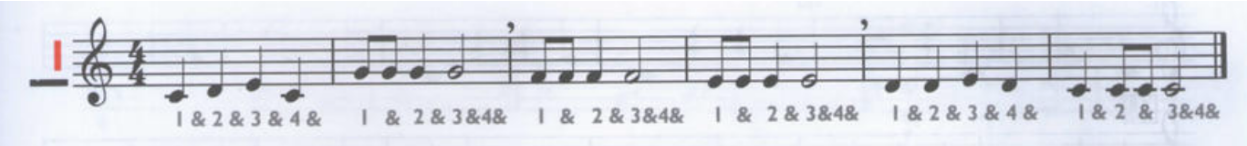


Figure 13. Yamaha Band Student: Book 1- Trumpet
Source: Sandy Feldstein and John O'Reilly, *Yamaha Band Student: Book 1- Trumpet,* (Van Nuys: Alfred Publishing Company, Inc., 1987), 10.

Summary

Rhythm counting systems play a pivotal role in music education by providing structured methodologies for teaching and internalizing rhythmic concepts. Several systems, including Gordon, Kodály, Traditional (Eastman), and Takadimi, offer distinct approaches to rhythm comprehension. The Gordon system employs syllables such as "Du" and "Du-de," focusing on audiation and the internalization of musical sounds. The Kodály method contains straightforward syllables like "Ta" and "Ti-ti," making it particularly suitable for elementary education due to its simplicity. The Traditional system combines numerical counts with syllables like "E & a" to denote beat subdivisions, though it received criticism for its complexity and inconsistencies. The Takadimi system emphasizes a "sound-to-symbol" approach, which aids in acquiring complex rhythms and syncopation. Consistent application of a selected system is crucial to prevent confusion and enhance rhythmic understanding. Research indicates that emphasizing beat subdivisions and the internalization of rhythms can significantly improve performance accuracy. Thus, the deliberate choice and consistent implementation of a rhythm-counting system profoundly influence students' ability to accurately interpret and perform rhythms, enriching their musical development and ensemble performance.

CHAPTER THREE: METHODS

Overview

This study compares three rhythm-counting systems, Traditional, Kodály, and Takadimi, to evaluate their effectiveness for beginner band students. The objective is to ascertain which system provides students with a superior comprehension of rhythms and facilitates the most accurate performance. Chapter Three will delineate the methodology and research design, encompassing the research questions and hypotheses, participants and setting, instrumentation, procedures, data collection plan, and data analysis of this quantitative quasi-experimental research study.

Design

This quantitative quasi-experimental research study compares differences in rhythm performance accuracy between three different elementary summer and school music programs. The students from each program receive rhythmic instruction supplemented by one of three different rhythm-counting systems. This research will allow music educators to discover which rhythm-counting system works best for beginner band students and enable them to choose a system they may have yet to consider implementing in the past.

The independent variable in this research study is the three rhythm-counting systems (Traditional, Kodály, and Takadimi) that supplement student instruction throughout the research and the assessments. Students in the Port Washington Union Free School District (UFSD) elementary summer and school music programs receive rhythm instruction supplemented by the Traditional counting system. The Island Trees Union Free School District elementary summer and academic year music program students receive instruction through the Kodály system. The students from another elementary school in the Port Washington UFSD receive rhythm

instruction through the Takadimi system. Before receiving any rhythm instruction, all students are audio-recorded on their ability to perform a two-measure rhythm excerpt. Students take another rhythm assessment on a similar two-measure rhythm excerpt after receiving rhythm instruction with the support of their respective rhythm-counting system and practicing similar rhythmic passages supported by the counting systems.

The dependent variables of this study are the students' rhythm performance accuracy on their rhythm assessments and the rhythm mistake criteria they make on the evaluations. The rhythm performance accuracy of the students from each of the three school programs receiving rhythmic instruction supplemented by the Traditional, Kodály, and Takadimi counting systems is determined through a Digital Audio Workstation (DAW) that can quantify rhythmic accuracy beat-by-beat throughout the two-measure rhythmic excerpts. Additionally, specific rhythmic mistake criteria are documented throughout the students' pre- and post-instruction rhythm assessments.

Similar studies have indicated the need for more research on the efficacy of rhythm-counting systems. Through a similarly structured quantitative study involving elementary trumpet students, Kohr, Chan, and Roslyn state, "Trumpet students who learn rhythm patterns using syllable systems performed better than those who learned conventionally. The metric counting of '1e&a' used in conventional teaching, based on the cognitive process of mathematical thinking, was found to be more time-consuming."[77] While Pearsall's study focused on tempo consistency rather than rhythmic accuracy, the methods and procedures were similar to this study and fostered significant results. Pearsall states, "Overall, the findings indicated that students who used the Kodály or Gordon rhythm syllable systems demonstrated greater tempo

[77] Khor, Chan, and Roslan, "Integrating Rhythmic Syllable," 1391.

consistency than students who used the "1 e and a" rhythm syllable system, but that there was no difference between the Kodály and Gordon groups concerning tempo consistency."[78] Fust's 2006 rhythmic study aligns most with this study as they share the same purpose and objectives. Fust states, "There is no syllable system that is a 'fix-all' for rhythmic mistakes of young players."[79] However, Fust experimented with only the Traditional and Takadimi counting systems, which may have limited her study from achieving more substantial results. This study will expand upon previous experiments and seek to discover a rhythm-counting system that is most efficient for beginner band students.

Research Questions

RQ1: Is there a difference in rhythm performance accuracy among beginning band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons?

RQ2: Is there a difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems?

RQ3: Is there a difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons?

---

[78] Pearsall, "Investigating the relationship," 52.

[79] Fust, "Syllable Systems," 43.

Hypotheses

$H1_0$: There is no difference in rhythm performance accuracy among beginner band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons as measured by differences in audio frequencies via GarageBand.

$H2_0$: There is no difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems as measured by differences in audio frequencies via GarageBand.

$H3_0$: There is no difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons.

Participants and Setting

This study included 146 fourth-grade students from three elementary summer and school music programs, all located on Long Island, New York. The participating school districts were Island Trees Union Free School District and Port Washington Union Free School District. All students received rhythm instruction supplemented by three different rhythm-counting systems determined by their school programs. The summer music programs are structured similarly, in which students receive one hour of music instruction every day, Monday through Friday, over three weeks. In the elementary school programs, students receive one thirty-minute lesson each week with other students who play the same instrument and attend full band rehearsals for one hour before school each week.

Population

The Island Trees Union Free School District, founded in 1902, is in Levittown, New York. It consists of two elementary schools, one middle school, and one high school. The district's mission is to educate students in the values, skills, and essential knowledge necessary to be informed. Responsible citizens become lifelong learners and take the following steps in their education, careers, and lives in our diverse society. The district provides opportunities for excellence and success for all students.[80] Island Trees has an enrollment of 2,182 students from kindergarten through twelfth grade.

Island Trees UFSD is proud of its award-winning Fine and Performing Arts program. All students have an opportunity for an education in the arts and many opportunities to reach great heights in the arts. Many Island Trees arts students have achieved recognition for their achievements at the local, county, state, and national levels. Art and music teachers work tirelessly to ensure all students have opportunities to shine and achieve. Performing ensembles, such as band, chorus, and orchestra, begin in fourth grade and continue through middle and high school. In addition to band, chorus, and orchestra, there are additional extracurricular school auditioned music ensembles if students are interested in furthering their music studies. In middle school, before and after school ensembles include jazz band and select choir. In high school, after-school ensembles include jazz band, jazz choir, and chamber orchestra.[81]

The Port Washington Union Free School District, founded in 1927, is in Port Washington, New York. There are 5,164 students enrolled in the school district, spread across five elementary

---

[80] Island Trees Union Free School District: Excellence & Success for All Students. Levittown, 2024. https://www.islandtrees.org

[81] Ibid.

schools, one middle school, and one high school. Port Washington School District encompasses a vibrant, diverse, and inclusive community that believes in the potential of every learner. They expect their graduates to become knowledgeable and responsible individuals who will thrive in and contribute to their world. Port Washington aspires to allow every student to pursue and explore their natural curiosities and to be challenged and supported with varied experiences that lead them to become fulfilled, lifelong learners.[82]

Port Washington believes in the unique learning opportunities provided by participating in the creative arts and their crucial role in educating the whole child. The district offers the students of the Port Washington Schools an arts curriculum that meets the New York State Learning Standards and Common Core Learning Standards and promotes high levels of academic and creative achievement.[83] Port Washington offers performing ensembles for students, including band, chorus, and orchestra, beginning in fourth grade and continuing through high school. There are several extracurricular music ensembles offered at the elementary, middle, and high school levels for students interested in excelling at music. For ten consecutive years, the Port Washington UFSD was selected as one of the "Best Communities for Music Education in the United States."

Sample

The participants in this study were beginner band students enrolled in summer and elementary school music programs within the Island Trees and Port Washington School Districts. These participants needed to be true beginners who lacked experience playing musical

---

[82] *Port Washington Union Free School District: Our Vision and Mission*, (Port Washington), 2024. https://www.portnet.org/apps/spotlightmessages/14612

[83] Ibid.

instruments. All participants were either entering fourth grade in the summer programs or were fourth-grade beginning students in the regular school year, a critical selection criterion given that students of different ages may have varying levels of exposure to and experience with music and rhythm, even in general music settings.

Although the participants may not have attended the same elementary school or had identical musical experiences, their uniform age was crucial for ensuring that the study accurately measured rhythmic performance. Including students with prior experience in reading rhythms and notation could introduce a bias toward one of the rhythm-counting systems, thereby skewing the results. The goal was to engage students as "clean slates," allowing the rhythm-counting system employed during their instruction to influence their ability to perform rhythms solely. Fust ensures the students of her study also have the same amount of rhythmic exposure:

> Sixth-grade students were preferred because that is when this district begins band. At this point, therefore, they would not be accustomed to a particular system of counting rhythms. This way, the study's results would not be misrepresented because a student might be more accustomed to a certain syllable system used in that band program rather than the syllables used in the study.[84]

This approach ensures that the collected data is analyzed effectively to determine the most effective rhythm-counting system for beginner instrumentalists.

Each of the three groups, consisting of the two school summer music programs and the regular elementary school programs, received rhythm instruction utilizing one of three distinct rhythm-counting systems. The Island Trees summer music and elementary school program employed the Kodály rhythm-counting system, while the Port Washington summer music and elementary school program utilized the Traditional counting method. A different elementary school in the Port Washington District instructed students through the Takadimi rhythm-counting

---

[84] Fust, “Syllable Systems,” 23.

system. Comparative analysis of rhythm performance accuracy, measured through pre- and post-instruction assessments, was conducted to ascertain which system produces the most substantial improvements among beginner band students.

Table 1. Student Information- Island Trees (Kodály System)

Student #	Program	Gender	Instrument
1	Summer	Male	Clarinet
2	Summer	Male	Alto Saxophone
3	Summer	Male	Alto Saxophone
4	Summer	Male	Alto Saxophone
5	Summer	Female	Trumpet
6	Summer	Male	Trumpet
7	Summer	Male	Percussion
8	Summer	Male	Percussion
9	School	Female	Flute
10	School	Female	Flute
11	School	Female	Flute
12	School	Female	Flute
13	School	Female	Flute
14	School	Female	Flute
15	School	Female	Clarinet
16	School	Female	Clarinet
17	School	Female	Clarinet
18	School	Female	Clarinet
19	School	Female	Clarinet
20	School	Female	Clarinet
21	School	Female	Clarinet
22	School	Female	Bass Clarinet
23	School	Male	Bass Clarinet
24	School	Male	Alto Saxophone
25	School	Male	Alto Saxophone
26	School	Male	Alto Saxophone
27	School	Male	Alto Saxophone
28	School	Male	Tenor Saxophone
29	School	Male	Trumpet
30	School	Male	Trumpet
31	School	Male	Trumpet
32	School	Male	Trumpet
33	School	Male	Trumpet
34	School	Male	Trumpet
35	School	Male	Trumpet
36	School	Male	Trumpet
37	School	Male	Trumpet

Student #	Program	Gender	Instrument
38	School	Male	Trumpet
39	School	Male	Trumpet
40	School	Male	Trumpet
41	School	Male	Trumpet
42	School	Male	Horn
43	School	Male	Horn
44	School	Male	Horn
45	School	Male	Horn
46	School	Male	Trombone
47	School	Male	Trombone
48	School	Male	Trombone
49	School	Male	Percussion
50	School	Male	Percussion
51	School	Male	Percussion
52	School	Male	Percussion

Table 2. Student Information- Port Washington Summer and School 1 (Traditional System)

Student #	Program	Gender	Instrument
1	Summer	Female	Flute
2	Summer	Female	Flute
3	Summer	Male	Clarinet
4	Summer	Male	Alto Saxophone
5	Summer	Female	Trumpet
6	Summer	Male	Trumpet
7	School	Female	Flute
8	School	Female	Flute
9	School	Female	Clarinet
10	School	Female	Clarinet
11	School	Female	Clarinet
12	School	Female	Clarinet
13	School	Female	Clarinet
14	School	Female	Clarinet
15	School	Female	Bass Clarinet
16	School	Female	Bass Clarinet
17	School	Male	Alto Saxophone
18	School	Male	Alto Saxophone
19	School	Male	Alto Saxophone
20	School	Male	Alto Saxophone
21	School	Female	Tenor Saxophone
22	School	Male	Tenor Saxophone
23	School	Female	Trumpet
24	School	Male	Trumpet
25	School	Male	Trumpet

Student #	Program	Gender	Instrument
26	School	Male	Trumpet
27	School	Male	Trumpet
28	School	Male	Horn
29	School	Male	Trombone
30	School	Male	Trombone
31	School	Male	Trombone
32	School	Male	Trombone
33	School	Male	Trombone
34	School	Male	Trombone
35	School	Male	Baritone
36	School	Male	Baritone
37	School	Male	Baritone
38	School	Male	Baritone
39	School	Female	Percussion
40	School	Female	Percussion
41	School	Male	Percussion
42	School	Male	Percussion
43	School	Male	Percussion
44	School	Male	Percussion

Table 3. Student Information- Port Washington School 2 (Takadimi System)

Student #	Program	Gender	Instrument
1	School	Female	Flute
2	School	Female	Flute
3	School	Female	Flute
4	School	Female	Flute
5	School	Female	Flute
6	School	Female	Flute
7	School	Female	Flute
8	School	Male	Flute
9	School	Female	Clarinet
10	School	Female	Clarinet
11	School	Female	Clarinet
12	School	Male	Clarinet
13	School	Male	Bass Clarinet
14	School	Male	Bass Clarinet
15	School	Male	Alto Saxophone
16	School	Male	Tenor Saxophone
17	School	Male	Tenor Saxophone
18	School	Male	Tenor Saxophone
19	School	Female	Trumpet
20	School	Female	Trumpet
21	School	Female	Trumpet

Student #	Program	Gender	Instrument
22	School	Male	Trumpet
23	School	Male	Trumpet
24	School	Male	Trumpet
25	School	Male	Trumpet
26	School	Male	Trumpet
27	School	Male	Trumpet
28	School	Male	Trumpet
29	School	Male	Trumpet
30	School	Male	Trumpet
31	School	Male	Trumpet
32	School	Male	Horn
33	School	Male	Horn
34	School	Male	Horn
35	School	Male	Trombone
36	School	Male	Trombone
37	School	Male	Trombone
38	School	Male	Trombone
39	School	Male	Trombone
40	School	Male	Trombone
41	School	Male	Trombone
42	School	Male	Trombone
43	School	Male	Baritone
44	School	Male	Baritone
45	School	Female	Percussion
46	School	Female	Percussion
47	School	Male	Percussion
48	School	Male	Percussion

Instrumentation

This study's quantitative data collection tool is the GarageBand Digital Audio Workstation. This sophisticated software can process Musical Instrument Digital Interface (MIDI) files and perform rhythm quantization through its comprehensive track editing features. Developed by Dr. Gerhard Lengeling in 2004, Apple's DAW has become one of the most widely adopted music editing software applications. Among its various capabilities, GarageBand facilitates the sequencing and synchronization of multiple music tracks. This study particularly emphasizes the software's rhythm quantization feature, using it to compare the latencies of sound

waves from student performances against the ideal quantization of rhythm assessments. The researcher imports the audio recordings of the students' pre- and post-instruction rhythm assessments to the GarageBand DAW and compares the rhythm quantization from the student entries to the correct quantization of the rhythm itself. The researcher calculates each student's error in rhythmic performances by aligning each audio performance with the track of the precise performance of the rhythm. Deviations between the two tracks are reported to the tenth of a beat and added together throughout the rhythm performance to determine the overall error rate. A higher numerical value indicates a more significant error, while a correctly played rhythm will result in a lower error value. Thus, rhythmic accuracy is quantized, and all student submissions are compared to determine which rhythm-counting system produced the most rhythmically accurate performances.

The methodology parallels the Tempo Consistency Measurement Procedure (TCMP) devised by Pearsall in 2009 in collaboration with Dr. Dimitar D. Deliysky. Pearsall's research involved converting performance files from Waveform Audio Format File (WAV) to Comma Separated Values (CSV) format, conducting a detailed analysis of the temporal distribution of energy exerted, and calculating the Macrobeat Jitter Ratio (MJR) to assess students' consistency in maintaining a steady tempo.[85] Similarly, this study conducts a comparative analysis of student performance files, focusing primarily on the accuracy of rhythmic execution rather than solely on tempo consistency.

Additionally, this study incorporates the coding system for rhythmic mistakes created by Fust in her research. Fust describes her methodology and logic behind making the system for measuring student error in the rhythmic passages encapsulated in her study:

---

[85] Pearsall, "Investigating the relationship," 39-46.

> Generally, students would hold a note or rest too long, play a note or rest too short, use the wrong syllable in counting the note within a rhythm, have an unsteady feeling of pulse, hesitate frequently within the passage, or play an incorrect rhythm. From this observation, categories were created for mistakes and each mistake was classified into one of the categories. The categories and abbreviations were: student held note or rest too long (H), played note or rest too short (P), used the wrong syllable in counting (W), kept an unsteady pulse during performance (U), made stops and hesitations due to rushing (S), or played an incorrect rhythm for any other reason (I).[86]

This methodology is also incorporated into this study to identify which aspects of rhythm performance students struggle with. Tallies under each rhythm error category will indicate the student's rhythmic mistakes. Fewer tallies indicate a more accurately performed rhythm. Thus, beginner band directors can determine a rhythm-counting system that addresses these specific difficulties to guide students on the right path to developing the rhythmic capabilities of all students.

Procedures

The procedures section outlines the requisite permissions from the study site and elaborates on the research protocols, encompassing recruitment, development of rhythmic assessments and practice materials, and data collection and analysis. This study employed a systematic approach consisting of six procedural steps, each designed to be replicable in any instrumental music education setting. Initially, the study group was established through the recruitment of participants and the acquisition of necessary permissions. Subsequently, rhythmic assessments and practice materials were developed according to specific parameters and criteria. The third step involved audio recording students as they performed the initial rhythm assessment, providing a baseline for subsequent comparisons. The fourth step required each cooperating teacher to deliver rhythm instruction to their respective study groups, incorporating practice with

---

[86] Fust, "Syllable Systems," 34.

the developed materials. Following this, the students' performances on the second rhythm assessment were audio-recorded, capturing their instrumental execution and chanting rhythm syllables according to the taught rhythm-counting system. The final step involved thoroughly analyzing the assessment results utilizing evaluation tools. This structured methodology ensures a rigorous and reliable assessment of the efficacy of different rhythm-counting systems in instrumental music education.

Permissions

Teachers from the summer music programs in the Island Trees Union Free School District (UFSD) and Port Washington Union Free School District (UFSD) participated in this study. Their collaboration necessitated formal consent, which was secured through a permission letter. The documentation required for this study comprised a permission request letter,[87] evidence of completed Collaborative Institutional Training Initiative (CITI) training,[88] parental consent forms,[89] child assent forms,[90] and the necessary instruments[91] and instructional materials[92] for data collection. Additionally, approval was granted by Liberty University's Institutional Review Board (IRB).[93] For further information, please contact Liberty University's IRB Department.

---

[87] Appendix A

[88] Appendix B

[89] Appendix C

[90] Appendix D

[91] Appendix E

[92] Appendix F

[93] Appendix G

Recruitment

The study groups were constituted based on the responses received from summer music program teachers to the recruitment letter. The inclusion criteria for participation stipulated that students must be fourth-grade elementary students with no prior experience in instrumental music. The cooperating music teachers and the researcher provided instruction supplemented by one of three distinct rhythm-counting systems. They recorded the students' pre- and post-instruction rhythm assessments and disseminated practice materials aligned with their chosen rhythm-counting system. The music teachers and the researcher communicated the study protocol to the students, who were allowed to participate voluntarily. While all students received instruction, data collection was exclusively conducted on those who consented to participate in the study.

Instruction

The specific day-to-day rhythm instruction students receive throughout this study resonates with the ideologies outlined by Kevin Mixon. He suggests the following learning sequence for beginning instrumental music reading and playing:

1. Tap basic beat (with heels of both feet with toes anchored to the floor), pat beat divisions (with one hand on the thigh while the other hand holds or supports the instrument), and rap melodic rhythm (using rhythm syllables or another counting system).
2. Tap basic beat (with heels), pat beat divisions (with one hand on the thigh) and sing passage (using tonal syllables or letter names).
3. Sing (using tonal syllables or letter names) and finger (trombones slide) on the instrument.
4. Finger (trombones slide) on instrument and airplay. (Form embouchure and tongue, and control breathing as if playing an instrument. At the teacher's discretion, brass players may buzz with or without the mouthpiece instead of air playing. For all wind instruments, check for proper tonguing, articulation, and breathing.)
5. Play (on the instrument). Repeat the passage several times and gradually increase speed until secure at the desired tempo.[94]

---

[94] Mixon, *Reaching and* Teaching, 66.

This study is centered solely on rhythm, rendering the steps involving pitch accuracy and tonal syllables inapplicable to rhythmic accuracy. Nevertheless, the methodological framework of this approach remains relevant when explicitly applied to rhythm, offering a means for students to enhance their rhythm reading and performance abilities.

To practice rhythms, students tap the basic beat with their heels while patting the subdivisions on their thighs. This step helps establish the pulse, allowing students to internalize a steady tempo and reducing the likelihood of deviation. Next, students vocalize the rhythm syllables in tempo while maintaining the tapping motion. The incorporation of kinesthetic activity enhances the students' embodied experience of rhythm, aiding in the successful execution of rhythmic patterns. Subsequently, students repeat the vocalization of rhythm syllables while holding their instruments and practicing fingerings or slide positions. To introduce articulation, students simulate playing the rhythms on their instruments by air playing, replacing the vocalized syllables with simulated articulations. Finally, students perform the rhythm on their instruments, internalizing the pulse while mentally referencing the rhythm syllables to guide accurate rhythmic execution. These practice sessions take place during the students' thirty-minute pull-out band lessons that occur weekly.

The three participating teachers in the study implemented this rhythm instruction approach, each of whom employed their respective rhythm-counting systems within their instructional settings. Teachers provided students with ample opportunities to practice applying the rhythm-counting system. Practice rhythms were generated using SightReadingFactory.com, which creates rhythmic examples based on predefined difficulty parameters. Teachers selected rhythm segments in the pre- and post-instruction performance assessments, and the website generated corresponding examples for student practice (see Appendix F). Through repeated

practice and performance experience, students gained increased familiarity and confidence in performing similar rhythmic patterns encountered in the post-instruction assessment.

Interventions

This quantitative quasi-experimental study investigates the effect of three distinct rhythm-counting methodologies on student instruction. Although all methods are assessed using uniform criteria, the instructional approaches differ due to the unique syllabic representations employed by each system to convey rhythmic patterns. Through direct instruction and targeted practice with rhythm patterns like those in the performance assessments, students develop the necessary skills to improve their comprehension and execution of rhythms. The extent of improvement in rhythm performance is influenced by individual student abilities and the degree to which the assigned rhythm-counting system aligns with their overall rhythmic proficiency.

Data Analysis

The quantitative data analysis for this research encompasses a paired samples *t*-test and an analysis of variance (ANOVA). A paired samples *t*-test addresses the first research question by comparing the means of pre- and post-instruction rhythm assessments, determining whether significant differences exist. These tests require one independent variable with two groups and a continuous dependent variable. The independent variable is the rhythm-counting system that supplements student instruction (Kodály, Traditional, and Takadimi). The dependent variable is the accuracy of the pre- and post-instruction rhythm assessments.

Additionally, box-and-whisker plots are generated for the three rhythm-syllable groups to identify potential outliers. The Kolmogorov-Smirnov test is conducted to assess the assumption of normality, while Levene's Test of Equality of Error Variance is applied to evaluate the assumption of equal variance. The results of this analysis will yield valuable insights into the

effectiveness of each rhythm-counting system for beginner band students, guiding recommendations for adoption by beginner band educators.

The second and third research questions utilize the analysis of variance (ANOVA) model. ANOVA does not focus on comparing differences between pairs of group means; instead, it examines the overall dispersion of group means and compares this variability to the expected spread of those means if all groups were sampled from the same population. Box-and-whisker plots are generated for each group and variable to identify potential outliers. The Kolmogorov-Smirnov test is conducted to assess the assumption of normality. Additionally, a series of scatter plots are created to examine the relationships between each group's pre-test and post-test variables, thereby assessing the assumption of linearity. These scatter plots also provide insights into the assumption of bivariate normal distribution, explicitly observing the presence of a classic cigar shape. Furthermore, the assumption of homogeneity of slopes is evaluated to identify potential interactions among variables. Levene's Test of Equality of Error Variance is applied to verify the assumption of equal variance.

The raw data is subjected to cross-analysis and presented in a box-and-whisker plot to assess the effectiveness of each of the three rhythm-counting systems under investigation. Outliers, both multivariate and univariate, identified through this analysis were carefully examined and suppressed based on the boxplot insights. This approach adheres to the MANOVA assumption, which stipulates the exclusion of multivariate and univariate outliers to ensure the validity of the analysis.

Levene's homogeneity test is conducted using the Statistical Package for the Social Sciences (SPSS) to assess compliance with the assumption of homogeneity of variance-covariance. An *f* value less than 0.05 would suggest that the variance and covariance of the

dependent variables are consistent across groups. Additionally, Box's M test of equality of covariance further evaluates this assumption.

Summary

This study evaluates the effectiveness of three rhythm-counting systems, Traditional, Kodály, and Takadimi, on beginner band students' rhythm performance. The quasi-experimental research design compares the effect of each system through pre- and post-instruction rhythm assessments conducted with 144 fourth-grade students from two summer music programs and three elementary school programs across two different school districts in Long Island, New York. The research involves analyzing performance data using GarageBand DAW, and it employs both a paired samples *t*-test and an ANOVA to determine which counting system results in the most significant improvement in rhythmic accuracy. The goal is to identify the most effective system for beginner band students, providing valuable insights for music educators.

CHAPTER FOUR: FINDINGS

Overview

This quantitative quasi-experimental study aims to evaluate differences in rhythm performance accuracy across three distinct instructional methodologies within educational settings, including two summer and school music programs and one other school program. The independent variable is the specific rhythm-counting system employed, comparing the Kodály, Traditional, and Takadimi methods. The dependent variables are the assessment scores students receive on the pre- and post-instruction rhythm assessments and the specific rhythmic mistakes students make throughout the assessments. Student performance is assessed through pre- and post-instruction evaluations, with data categorized into two key areas: rhythmic accuracy determined by rhythmic margin of error, measured in beats using the GarageBand DAW, and specific types of rhythmic mistakes. These errors are categorized as follows: holding a note or rest too long (H), playing a note or rest too short (P), using an incorrect syllable in counting (W), maintaining an unsteady pulse (U), exhibiting rushing behaviors resulting in stops or hesitations (S), or performing an incorrect rhythm for any other reason (I). Chapter four comprehensively analyzes the quantitative results, including data from the *t*-tests, ANOVA, and corresponding assumptions testing.

Research Questions

RQ1: Is there a difference in rhythm performance accuracy among beginning band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons?

RQ2: Is there a difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems?

RQ3: Is there a difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons?

Null Hypotheses

$H1_0$: There is no difference in rhythm performance accuracy among beginner band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons as measured by differences in audio frequencies via GarageBand.

$H2_0$: There is no difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems as measured by differences in audio frequencies via GarageBand.

$H3_0$: There is no difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons.

Descriptive Statistics

The research design incorporated one *t*-test and two analyses of variance (ANOVA). Specifically, a *t*-test was conducted to address Research Question 1, while Research Questions 2 and 3 required ANOVA for analysis. Statistical Package for the Social Sciences (SPSS) version 29 was employed to statistically analyze the study's dependent variables. The three instructional settings where students received instruction calculated and organized descriptive statistics, including the mean, standard deviation, and sample size for each dependent variable.

For the paired-sample *t*-test, the pre-test mean was 13.650 with a standard deviation of 0.6214, based on a sample of 146 students. The post-test mean was 8.859 with a standard deviation of 0.4428, also among 146 students (refer to Table 4). The effect size, represented by Cohen's d, was calculated at 0.735. The researcher derived this value by subtracting the post-test mean from the pre-test mean and dividing it by the pooled standard deviation, yielding $d = \frac{13.650-8.859}{6.519451} = 0.735$.

Table 4. Paired-Samples *t*-Test Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Margin of error in tenths of a beat (Pre-test)	13.650	146	7.5085	.6214
	Margin of error in tenths of a beat (Pre-test)	8.859	146	5.3506	.4428

The ANOVA analysis yielded post-test means and standard deviations for each rhythm-counting system. For the Traditional counting system, the post-test mean was 9.130 with a standard deviation of 5.9382, based on a sample of 46 students. The Kodály counting system produced a post-test mean of 8.427 with a standard deviation of 5.2902 among 52 students. The Takadimi counting system's post-test mean was 9.067, with a standard deviation of 4.8856 among 48 students. Across all groups, the combined post-test mean was 8.859 with a standard deviation of 5.3506, drawn from 146 students (refer to Table 5).

Table 5. ANOVA Descriptive Statistics

Dependent Variable: Margin of error in tenths of a beat (Post-test)

Rhythm System	Summer or School Program	Mean	Std. Deviation	N
Traditional	Summer	8.933	5.3181	6
	School	9.160	6.0873	40
	Total	9.130	5.9382	46
Kodály	Summer	9.225	1.8030	8
	School	8.282	5.7029	44
	Total	8.427	5.2902	52
Takadimi	School	9.067	4.8856	48
	Total	9.067	4.8856	48
Total	Summer	9.100	3.5568	14
	School	8.833	5.5160	132
	Total	8.859	5.3506	146

The statistical analysis reveals that students instructed using the Kodály counting system exhibited a lower mean margin of error, quantified in tenths of a beat by GarageBand, thus demonstrating superior accuracy in rhythm performance assessments compared to those instructed via the Traditional and Takadimi systems. The rhythmic accuracy scores of students taught using the Traditional and Takadimi systems were comparable, each showing an average margin of error of less than one-tenth of a beat, as measured by GarageBand.

The margin of error in beats reflects specific points where students deviated from the target rhythm, thereby indicating the degree of rhythmic inaccuracy. Furthermore, the frequency

of values within the data underscores the most recurrent rhythmic errors among students, offering insights into prevalent error patterns observed during performance.

Assumptions Tests

t-Test

The assumptions underlying the *t*-test in this study include independence, normality, absence of extreme outliers, and equal variance.[95] Independence is ensured, as the pre- and post-instruction rhythm assessment scores are independent; scores from one test within each of the three instructional systems do not impact or influence the scores from another. The assumption of normality was evaluated using the Kolmogorov-Smirnov test (see Table 6), while Levene's test of equality of error variances confirmed the assumption of homogeneity of variance across groups. No extreme outliers were detected, supporting the validity of the *t*-test assumptions.

Assumption of Normality

The Kolmogorov-Smirnov test revealed that the Takadimi post-test variable did not meet the assumption of normality (refer to Table 6). In contrast, all pre-test and post-test variables for the Traditional and Kodály systems met this assumption. Figures 16 through 18 illustrate the distributions of variables for *t*-tests and ANOVA, visually representing their adherence to the assumptions necessary for accurate analysis.

---

[95] Rebecca M. Warner, *Applied statistics: From bivariate through multivariate techniques*, (Thousand Oaks: Sage Publishers, Inc., 2013), 1.

Table 6. Kolmogorov-Smirnov Test: Assumption of Normality

	Rhythm System	Statistic	df	Sig.
Margin of error in tenths of a beat (Pre-test)	Traditional	.199	46	< .001
	Kodály	.181	52	< .001
	Takadimi	.140	48	.019
Margin of error in tenths of a beat (Post-test)	Traditional	.103	46	.200
	Kodály	.154	52	.004
	Takadimi	.117	48	.101

Assumption of No Outliers

The box-and-whisker plot identified several outliers, indicating a violation of the assumption regarding their absence. Specifically, cases 33, 36, and 46 were considered outliers within the Traditional counting system, while cases 48, 56, 57, 59, 60, 64, 66, and 68 were outliers in the Kodály counting system. The Takadimi counting system exhibited only one outlier, case 110 (see Figure 14). Despite these outliers, they were retained in the analysis, as the *t*-test is sufficiently robust to tolerate violations of the outlier assumption. Additionally, the data meet other assumptions necessary for valid analysis, including continuity, homogeneity of variance, demonstrating similar variability across groups, and approximately normal distribution (refer to Figures 15-17).

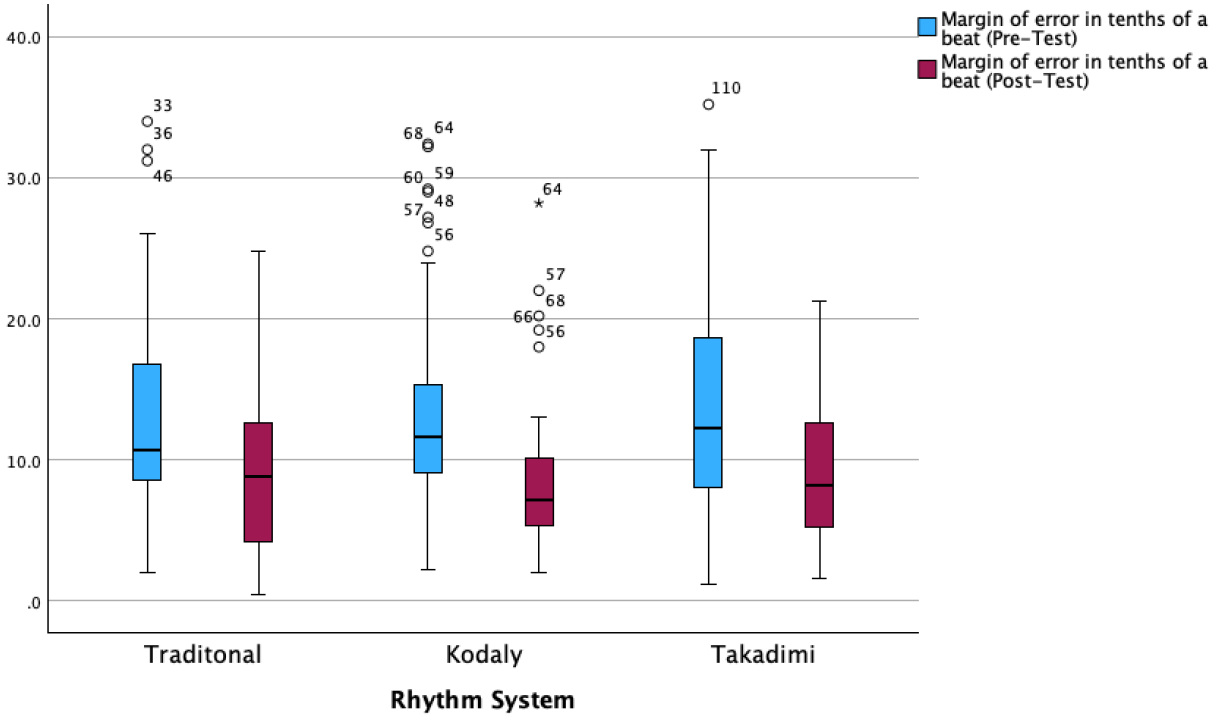


Figure 14. Box Plot: Margin of Error in Tenths of a Beat

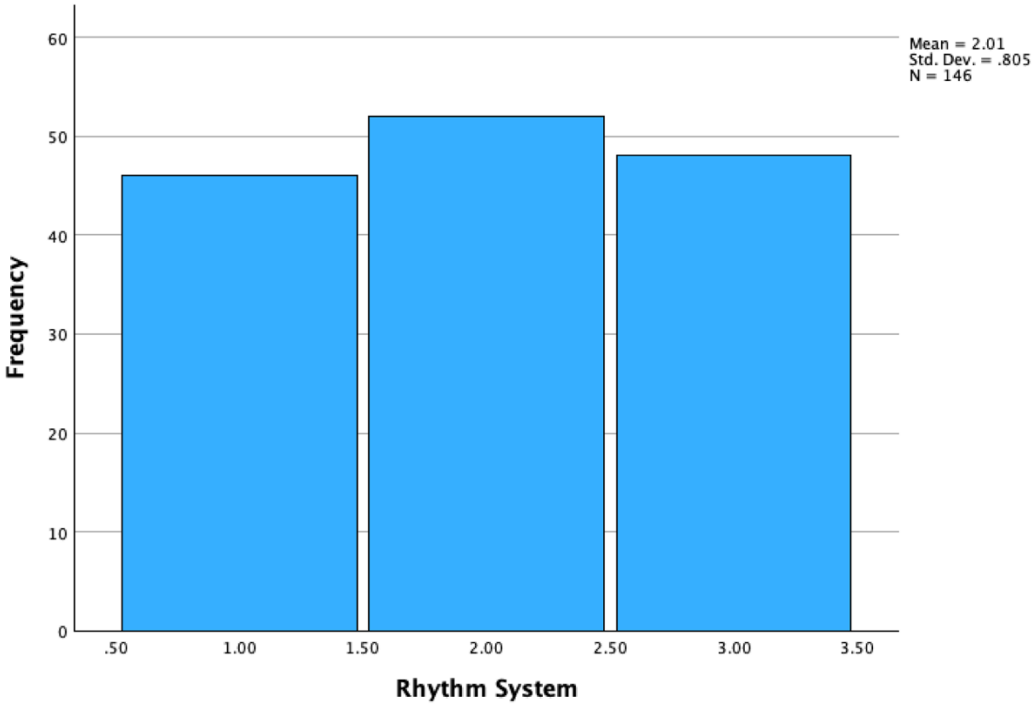


Figure 15. Histogram of Rhythm Systems

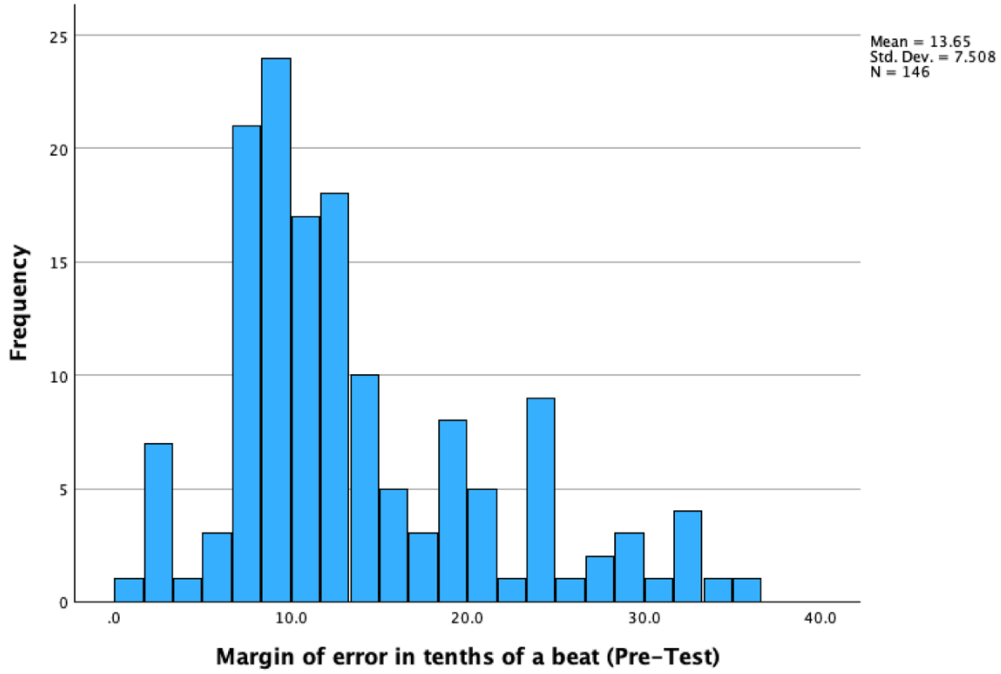


Figure 16. Histogram of Pre-Tests

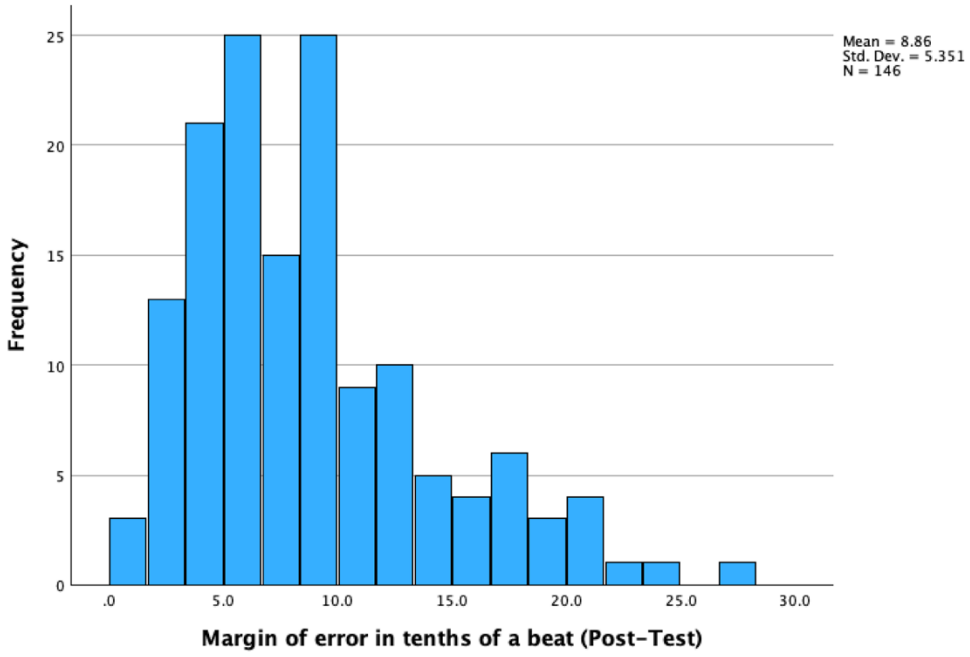


Figure 17. Histogram of Post-Tests

Assumption of Homogeneity of Variance-Covariance

Levene's Test of Equality of Error Variance was conducted via SPSS to assess compliance with the assumption of homogeneity of variance-covariance (see Table 7). The test yielded a p-value greater than .05 for the dependent variables, indicating no statistically significant difference in variances. Consequently, the assumption of homogeneity of variances is met, as the dependent variables exhibit equal variances across groups.[96]

Table 7. Levene's Test of Equality of Error Variances

		Levene Statistic	df1	df2	Sig.
Margin of error in tenths of a beat (Post-test)	Based on Mean	1.158	2	143	.317
	Based on Median	1.197	2	143	.305
	Based on Median and with adjusted df	1.197	2	137.383	.305
	Based on trimmed mean	1.190	2	143	.307

ANOVA

In experimental research, analysis of variance (ANOVA) is a robust statistical method employed to examine differences among naturally occurring groups, allowing for the simultaneous analysis of multiple dependent variables on the null hypothesis.[97] Conducting an ANOVA requires adherence to several key assumptions. Firstly, ANOVA necessitates an independent variable that includes various groups and the independence of all observations. In

[96] Warner, *Applied statistics,* 192.

[97] James O. Aldrich, *Using IBM SSPS Statistics: An Interactive Hands-On Approach*, (Thousand Oaks: Sage Publications, Inc., 2017), 14.

this study, the independent variable is represented by three distinct rhythm-counting systems implemented across two summer and one school music program. Specifically, one program employed the Kodály rhythm system, another utilized the Traditional rhythm system, and the third adopted the Takadimi system. Participants were instructed exclusively within one of these systems, ensuring they were not exposed to multiple instructional methods.

Additionally, ANOVA requires that the dependent variables are typically distributed. This study categorized specific rhythmic errors identified during student assessments into six criteria. Within behavioral sciences, ordinal items aggregated into sub-scales with established reliability and validity are often treated as interval scales, which are considered continuous. This treatment of interval scales as continuous variables ensures that the dependent variables in this study meet the statistical assumptions required for ANOVA.

Data Screening

The data for each group's dependent variable are thoroughly screened to identify entry errors, inconsistencies, or extreme outliers. The researcher detected no data errors or inconsistencies were detected during this review. The dataset was reexamined for measurement and entry errors, and all data were retained for analysis.

Assumption of Normality

The Shapiro-Wilk statistic was used to assess the data's normality assumption. A p-value greater than 0.05 suggests that the assumption is met.[98] According to the results of the Shapiro-Wilk normality test (see Table 3), only the post-test margin of error, measured in tenths of a beat via GarageBand for the Takadimi counting system, satisfied the assumption of normality. All other categories, however, violated this assumption.

---

[98] Aldrich, *Using IBM SSPS Statistics*, 13.

Table 8. Shapiro-Wilk Test: Assumption of Normality

	Rhythm System	Statistic	df	Sig.
Margin of error in tenths of a beat (Pre-test)	Traditional	.891	46	< .001
	Kodály	.869	52	< .001
	Takadimi	.945	48	.025
Margin of error in tenths of a beat (Post-test)	Traditional	.942	46	.023
	Kodály	.851	52	< .001
	Takadimi	.953	48	.053

In addition to the Shapiro-Wilk statistic, the Q-Q plots for both dependent variables further support the evaluation of normality (see Figures 18-19). Consistent with the findings from the Shapiro-Wilk test, the Q-Q plots demonstrate minimal to no deviations from the expected normal distribution, reinforcing the assumption of normality for these variables.

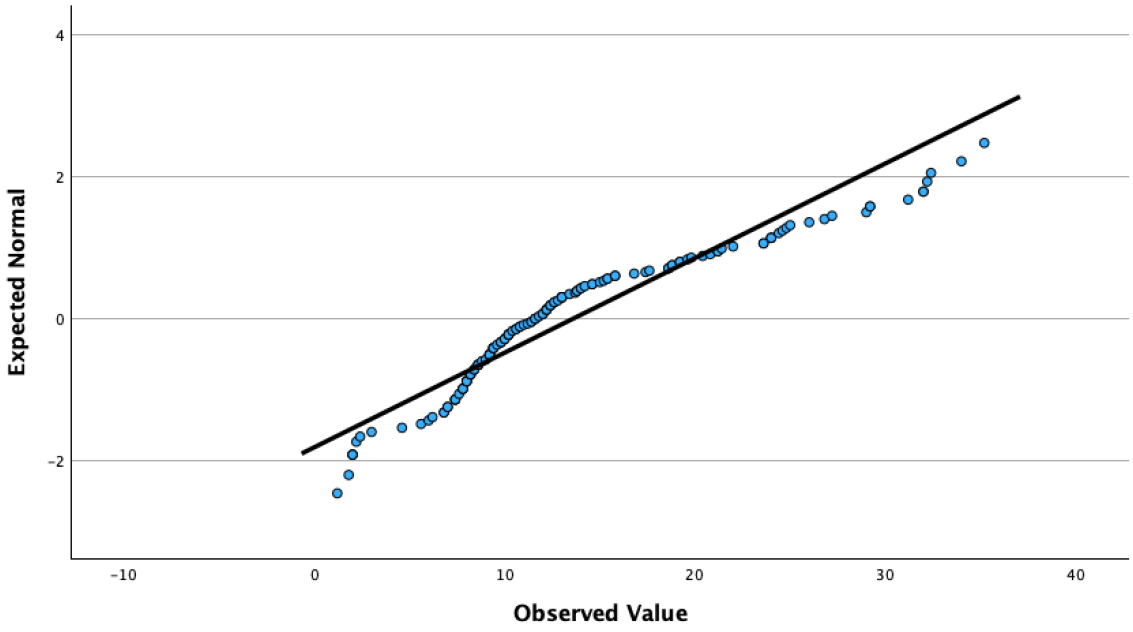


Figure 18. Q-Q Plot for Margin of Error in Tenths of a Beat (Pre-test)

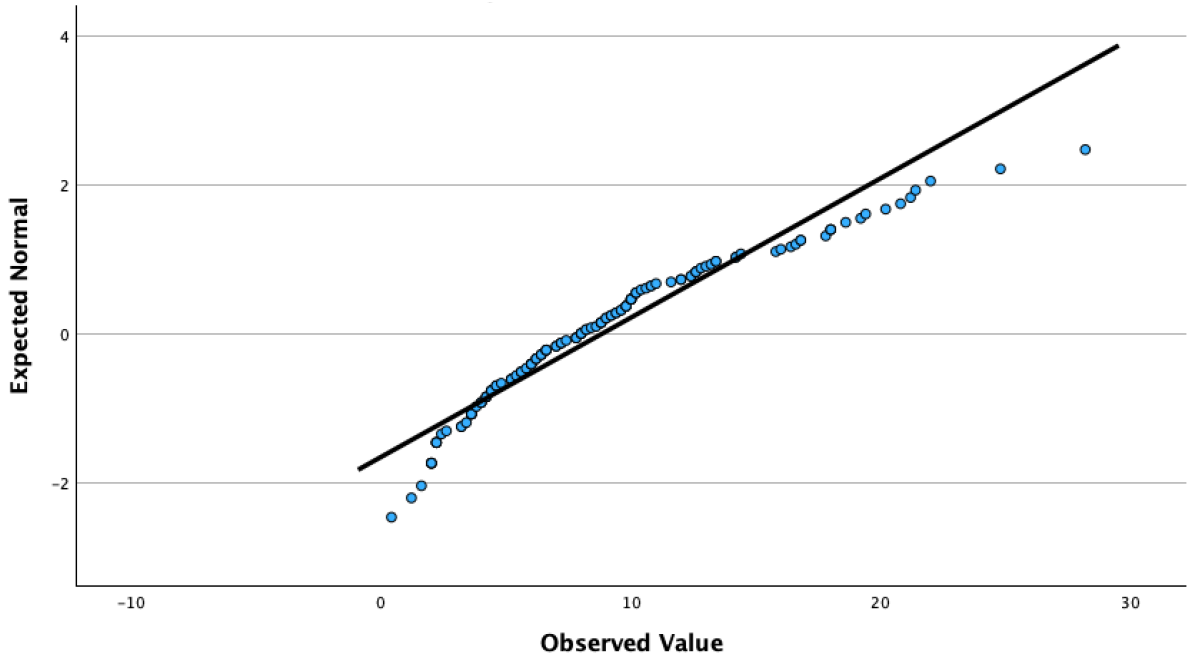


Figure 19. Q-Q Plot for Margin of Error in Tenths of a Beat (Post-test)

Results

Hypothesis One

A significant difference was observed between students' pre- and post-instruction rhythm assessment scores. The results of the paired samples *t*-test indicated a statistically significant effect, $t\ (146) = 10.987$, $p < .001$. Consequently, the null hypothesis was rejected, suggesting that the interventions implemented by the instructors resulted in improved rhythmic performance accuracy among the students.

Table 9. Paired Samples *t*-Test Results

		t	df	One-Sided p	Two-Sided p
Pair 1	Margin of error in tenths of a beat (Pre-Test) – Magin of error in tenths of a beat (Post-Test)	10.987	145	< .001	< .001

Hypothesis Two

There was no significant difference in rhythm performance accuracy on post-tests among students who learned by implementing the Traditional, Kodály, and Takadimi rhythm-counting systems. The results of the ANOVA test conducted to address Research Question 2 did not yield statistical significance; consequently, the null hypothesis was not rejected, with a p-value of .923 ($p > 0.05$) (see Table 10).

Table 10. ANOVA Results Research Question Two

Dependent Variable: Margin of error in tenths of a beat (Post-Test)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent Parameter	Observed Power[b]
Corrected Model	21.457[a]	4	5.364	.183	.947	.005	.733	.088
Intercept	4577.992	1	4577.992	156.307	< .001	.526	156.307	1.000
Rhythm System	4.704	2	2.352	.080	.923	.001	.161	.062
Summer School	1.513	1	1.513	.052	.821	.000	.052	.056
Rhythm System Summer School	4.032	1	4.032	.138	.711	.001	.138	.066
Error	4129.678	141	29.288					
Total	15609.240	146						
Corrected Total	4151.133	145						

Students whose instruction included the Kodály rhythm-counting system exhibited the lowest mean margin of error, measured at 8.427 tenths of a beat. In contrast, the Traditional counting and Takadimi systems yielded 9.130 and 9.067 tenths of a beat, respectively. However, the observed differences in mean margins of error among the three systems were not statistically significant enough to conclusively assert that the Kodály rhythm-counting system is the most effective in promoting optimal rhythm performance outcomes.

Hypothesis Three

There was no significant difference in the rhythm mistake criteria on pre- and post-instruction rhythm assessments among student groups receiving instruction in the Traditional, Kodály, and Takadimi systems. The results of the ANOVA test conducted to address Research Question 3 did not reveal statistical significance; therefore, the null hypothesis was not rejected, with a p-value of .346 ($p > 0.05$) (see Table 11).

Table 11. ANOVA Results Research Question Three

Dependent Variable: Rhythm System

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Corrected Model	25.221[a]	29	.870	1.595	.056	.388	46.250	.954
Intercept	213.760	1	213.760	391.990	< .001	.843	391.990	1.000
PreTest Error1	.617	5	.123	.266	.950	.015	1.131	.101
PostTest Error1	9.917	5	1.983	3.637	.005	.199	18.186	.908
PreTest Error1 PostTest Error1	11.659	19	.614	1.125	.346	.227	21.380	.718
Error	39.808	73	.545					
Total	518.000	103						
Corrected Total	65.029	102						

Rhythm Mistake Frequency

The classification of student errors during pre- and post-instruction rhythm performance assessments consists of six distinct criteria: holding a note or rest for too long (H), playing a note or rest for too short a duration (P), using incorrect syllables in counting (W), maintaining an unsteady pulse (U), exhibiting rushing behaviors that lead to stops or hesitations (S), and performing an incorrect rhythm due to other factors (I).

Analyzing the frequency of these rhythmic errors sheds light on the distribution and prevalence of specific mistakes among students (refer to Tables 12 and 13). In the pre-instruction

assessments, the most frequently observed error was holding a note or rest for too long, with 20.5% of students committing this mistake. In contrast, the predominant rhythmic error identified in the post-tests was performing an incorrect rhythm due to other factors (I), affecting 20.5% of students.

Table 12. Frequency Table of Rhythmic Error (Pre-test)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	H	30	20.5	21.3	21.3
	P	18	12.3	12.8	34.0
	W	24	16.4	17.0	51.1
	U	29	19.9	20.6	71.6
	S	12	8.2	8.5	80.1
	I	28	19.2	19.9	100.0
	Total	141	96.6	100.0	
Missing	System	5	3.4		
Total		146	100.0		

Table 13. Frequency Table of Rhythmic Error (Post-test)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	H	7	4.8	6.6	6.6
	P	25	17.1	23.6	30.2
	W	7	4.8	6.6	36.8
	U	19	13.0	17.9	54.7
	S	18	12.3	17.0	71.7
	I	30	20.5	28.3	100.0
	Total	106	72.6	100.0	
Missing	System	40	27.4		
Total		146	100.0		

A subset of students did not commit any rhythmic mistakes categorized in the classifications during the pre- and post-instruction rhythm assessments. Notably, the number of students who made no rhythmic mistakes increased significantly, from five pre-instruction assessments to forty post-instruction assessments. This substantial increase indicates a marked improvement in rhythm performance abilities across all three rhythm-counting instruction systems.

Summary

The paired samples *t*-test conducted in this study demonstrates that students significantly improved rhythmic accuracy between pre- and post-instruction rhythm assessments. However, the ANOVA analyses performed for research questions two and three revealed no statistically significant differences among the three instructional methods, leading to the failure to reject the

null hypothesis. The findings suggest that none of the rhythm-counting systems (Kodály, Traditional, or Takadimi) yielded significantly better student rhythm performance accuracy outcomes. As a result, the null hypotheses were accepted, indicating no meaningful differences between the groups. The subsequent chapter will explore the implications of these findings in the context of the existing literature.

CHAPTER FIVE: CONCLUSIONS

Overview

This chapter analyzes the research questions and results obtained from the paired samples *t*-test and two analyses of variance (ANOVAs) conducted to evaluate the efficacy of different rhythm-counting systems for beginner instrumentalists. The researcher interprets the outcomes of the *t*-test and ANOVAs, considering existing literature and the study's conceptual framework. Additionally, this chapter addresses contributions to the literature, discusses implications, considers limitations, and offers recommendations for future research.

Discussion

Summary of Study

This study is motivated by the need for a consensus among beginner band instructors on the optimal rhythm-counting system for their students. Rhythm is a foundational element of music, requiring precision for accurate performance; thus, a consistent and effective counting system is essential to support student success. Students will encounter increasingly complex rhythms as they progress in their musical studies, making it critical that educators provide them with a reliable counting system. Such a system should support students in learning current material and empower them to independently analyze, count, and perform challenging rhythms in future pieces. Achieving accuracy in the rhythms of performance repertoire is a valuable short-term goal. However, equipping students with a counting system they can internalize and use autonomously reflects a more profound comprehension of rhythmic concepts, demonstrating that students can apply the system as a lasting educational tool.

Numerous rhythm-counting systems are practiced by music educators globally, each grounded in the belief that the system they teach will best support students' success in music

literacy and performance. This study seeks to align the perspectives of instrumental music educators regarding rhythm-counting systems that foster a robust understanding of rhythm and its functions; equipping students with the skills to decode complex rhythms, they may encounter in the future. Educators who engage with this study may reflect on and reevaluate their current philosophies and pedagogical approaches to rhythm counting. The findings may inspire them to explore and implement alternative rhythm-counting systems. Since rhythmic accuracy is a foundational goal for music educators, establishing a researched, consistent approach can help reduce confusion for students and teachers and promote a cohesive educational framework for rhythm instruction.

This study investigated three approaches to rhythmic instruction, each supplemented by a distinct rhythm-counting system, to address the following research questions:

Research Question One: Is there a difference in rhythm performance accuracy among beginning band students' pre- and post-assessment following instruction in Traditional, Kodály, and Takadimi lessons?

Research Question Two: Is there a difference in rhythm performance accuracy among beginning band students between Traditional, Kodaly, and Takadimi rhythmic instruction training systems?

Research Question Three: Is there a difference between rhythmic mistake criteria (holding notes/rests too long, playing notes/rests too short, keeping an unsteady pulse during performance, making stops or hesitations due to rushing, or playing incorrect notes for any other reason) by student groups receiving instruction in Traditional, Kodály, and Takadimi lessons?

This study employs a quantitative, quasi-experimental design to address each of the three research questions. It involves three educational settings, each utilizing a distinct rhythm-counting system in its instructional practices. The researcher assesses students' rhythm

performance abilities through pre- and post-instruction rhythm performance assessments via the digital audio workstation (DAW) GarageBand. This software allows for precise quantization of students' rhythmic performances by comparing audio frequencies to the expected rhythmic timing, allowing for an accurate measurement of rhythmic accuracy.

The study sample comprises 146 elementary students from three distinct school programs, including participants from summer music programs and others who received instruction during the regular school year. The study required collaboration with three music educators, each utilizing the rhythm-counting system they deemed most effective for their instructional goals: Traditional, Kodály, and Takadimi. Over a four-week intervention period, students received rhythm instruction aligned with their teacher’s chosen counting system, engaging in activities such as counting, clapping, and performing rhythms according to the syllabic patterns inherent to each system. At the end of this period, students were assessed on rhythms like those in their pre-assessments, enabling an analysis of their growth in rhythmic comprehension and performance accuracy.

Summary of Findings

The quantitative research yielded comparable data across the three rhythm-counting systems implemented by the teachers. Pre- and post-instruction rhythmic accuracy assessments were analyzed to evaluate students' improvement in rhythm performance accuracy following the three-week instructional period. Additionally, the researcher compares the results from each system to identify which counting system facilitated the highest level of rhythmic accuracy. Specific categories of rhythmic errors commonly made by students were documented and analyzed to assess whether the counting system influenced the types of mistakes students made.

First, a paired samples *t*-test examines differences in student performance between the pre- and post-instruction rhythm assessments. The data revealed a statistically significant improvement, indicating that the instruction provided by teachers across the three educational settings positively influenced students' rhythm performance. Regardless of the rhythm-counting system utilized, results showed a reduction in students' margin of error, measured in tenths of a beat via GarageBand. This suggests that the instructional interventions improved students' rhythm performance accuracy.

The researcher conducted an ANOVA with SPSS version 29 to compare the post-instruction rhythm performance results across the three rhythm-counting systems. This aimed to determine if one system was significantly more effective for beginning band teachers. The results failed to reject the null hypothesis, indicating no statistically significant difference in effectiveness among the three rhythm-counting systems. Thus, no specific system emerged as the preferred choice for beginning band instruction. However, the data did show that students instructed with the Kodály system achieved the smallest mean margin of error on their post-instruction rhythm assessments, suggesting a slight edge in accuracy for this system.

The Kodály system is widely practiced in general elementary music curricula, with previous studies underscoring the importance of consistency in supporting student achievement. When elementary general music teachers use the Kodály counting system, it would be pedagogically beneficial for instrumental teachers to continue with it, as it builds on the familiarity students developed in their early music experiences. Regardless of the chosen system, music educators should aim for a cohesive approach by selecting a preferred system, maintaining consistency within their instruction, and collaborating with other instrumental teachers in the

same school district. This alignment minimizes the potential for student confusion when adjusting to different counting systems.

The researcher conducted an additional analysis of variance (ANOVA) to address the third research question, investigating whether there was a correlation between the rhythm-counting systems employed by instructors and the specific types of rhythmic errors students made in their pre- and post-instruction assessments. The results did not yield statistically significant findings, suggesting no observable relationship between the rhythm-counting systems utilized and the nature of the rhythmic errors observed. In the pre-instruction assessments, errors were distributed relatively evenly across the categories, with the three most frequent mistakes differing by less than 1%. The most common errors were holding a note or rest for an excessive duration (20.5% of students), exhibiting an unsteady pulse (19.9% of students), and performing an incorrect rhythm due to various other factors (19.2% of students).

The proportion of students who made no rhythm mistakes increased significantly from the pre- to the post-instruction rhythm assessments. While only 3.7% of students were error-free in the pre-instruction evaluation, this percentage rose to 27.4% in the post-instruction assessment. This substantial increase supports the findings of the paired samples *t*-test in response to the first research question, confirming that, regardless of the rhythm-counting system employed, students showed considerable improvement in their rhythm performance following instruction and practice.

In the post-instruction assessment, the most frequent error was performing an incorrect rhythm due to various factors, with 20.5% of students making this mistake. A common issue within this category was performing sixteenth notes too slowly as if they were eighth notes. Although this error was prevalent, students demonstrated much greater accuracy in other

rhythmic aspects, contributing to the overall improvement in their rhythm performance, as reflected in the reduced margin of error scores.

Conclusion

Previous research on student rhythm performance has yielded findings that align closely with the outcomes of this study. The researcher adopted the same rhythm error identification criteria employed in Tammy Fust's 2006 qualitative study on rhythm systems. Fust states, "Observations suggested that of the mistakes that were made, playing a note for the incorrect duration and using the wrong syllables were the most frequent mistakes among the four students."[99] Similarly, in the present study, the most common rhythm error identified was playing a note for an incorrect duration, explicitly playing a note too long, echoing Fust's findings. The results of both studies also share notable parallels. Fust states, "Overall, the observations suggested that students using the 'Takadimi' system of counting seemed more proficient in playing without hesitations and counting using correct syllables in lessons."[100] Although the researcher's study did not reveal statistically significant differences among the three rhythm-counting systems, the data indicated that the Takadimi system was slightly more effective than the other systems, consistent with Fust's findings. Fust also included an interview in which she analyzed students' experiences practicing and learning rhythms with the different counting systems. The inclusion of this interview aspect and the fact that she only had four student participants in the study made her study qualitative.

The findings of this study suggest that implementing any rhythm-counting system contributes to significant improvements in student rhythm performance accuracy. Statistical

---

[99] Fust, "Syllable Systems," 35.

[100] Ibid., 35.

analysis through a paired samples *t*-test in the current study indicates a statistically significant difference between students' pre- and post-instruction assessment scores, demonstrating the effectiveness of each rhythm-counting system utilized. These results are consistent with the findings of Brett Allen Janssen's 2017 study, which examined three groups of college aural skills students. Janssen observed that while students began instruction at varying levels of rhythmic competency, their rhythmic accuracy scores converged by the study's conclusion, reflecting substantial progress across all groups.[101] His findings emphasized that rhythm instruction enhances rhythmic accuracy and fluency regardless of the specific counting system employed. Similarly, the present study demonstrated that all participants significantly improved their rhythm performance from pre- to post-instruction assessments. These results further reinforce the conclusion that rhythm instruction, regardless of the counting system implemented, improves rhythmic accuracy.

Tara Pearsall's research narrowed the focus of rhythm performance by concentrating specifically on the steadiness of tempo. While this error criterion is a common issue for many students, it represents only one facet of rhythmic performance, as students exhibit a variety of rhythmic errors that could be mitigated through the implementation of rhythm-counting systems. Pearsall contended that measuring overall rhythmic accuracy is overly broad and does not yield conclusive results.[102] This perspective is supported by the findings of the present study, where the measurement of overall rhythmic accuracy revealed a wide distribution of errors, making it difficult to determine the relative effectiveness of specific rhythm-counting systems.

---

[101] Janssen, "A Preliminary Comparative Study," 62-63.

[102] Pearsall, "Investigating the relationship," 5-6.

The inconclusive results of this study highlight the potential benefits of adopting a more focused approach that isolates specific characteristics of rhythm performance. Such an approach may provide more precise insights into the effectiveness of rhythm-counting systems, particularly in instruction for beginning band students. Future research should consider refining the scope to target specific elements of rhythm performance, such as tempo steadiness or rhythmic subdivision accuracy, to generate more definitive conclusions regarding the instructional efficacy of various rhythm-counting methodologies.

Implications

Historically, evaluating teachers develop rubric systems to assess rhythmic accuracy. While these rubrics include specific criteria to evaluate students' ability to perform rhythms accurately, they are not the most reliable method for quantifying rhythmic precision. DeLuca and Bolden state, "It is difficult to articulate criteria that accurately describe the nuances of student performance. Often, rubrics use too subjective and ambiguous language to enable students and teachers to consistently identify significant performance features at various levels."[103] Previous studies on rhythmic accuracy have utilized rubric-based grading systems or focused on identifying common rhythmic mistakes students make when learning to perform rhythms. A 2019 study on dance performance and rhythmic synchronization divided participants into two groups and implemented a rubric to measure synchronization accuracy to evaluate rhythmic performance.[104] While this study focused on dance, it shares the principle of assessing rhythm performance with a clear rubric of performance accuracy. Karageorghis, Lyne, Bigliassi, and

---

[103] Christopher DeLuca and Benjamin Bolden, "Music Performance Assessment: Exploring Three Approaches for Quality Rubric Construction," *Music Educators Journal*, (Thousand Oaks: Sage Publishing, 2014), 71.

[104] Costas I. Karageorghis, Lianne P. Lyne, Marcelo Bigliassi, and Peter Vuurst, "Effects of Auditory Rhythm on Movement Accuracy in Dance Performance," (London: Brunnel University Archive, 2019), 3.

Vuurst state, “Accuracy scores were computed by summing individual scores in each measure for the dance movements across the three rhythm conditions, with a minimum accuracy score of 0 and a maximum of 4 for each measure (musical bar).”[105] The rubric employed in this study was scored by multiple raters, which introduces the possibility of bias or inconsistencies in interpreting certain performance aspects. Such variability may stem from differing understandings of the criteria associated with each score level, which could compromise the reliability of the ratings. Given that scoring systems based on rubrics often involve subjective human judgment, they may not provide the most reliable method for accurately measuring performance. This potential for inconsistency highlights the importance of ensuring clear, standardized criteria and minimizing human interpretation to enhance the objectivity and reliability of performance evaluations.

In contrast, the present study employed a digital audio workstation (DAW) to objectively quantify rhythmic accuracy by aligning the audio frequencies with the precise points where an accurately performed rhythm should occur for each beat. This meticulous process of assessing rhythmic accuracy provides the most accurate measure of students' understanding of rhythm, as it enables a clear visual representation of every beat and measure, allowing for detailed analysis of the students' rhythmic performance.

This study focused on three rhythm-counting systems. However, it is essential to note that numerous other systems, often variations, exist and are regularly practiced in different regions worldwide. However, given that the three systems featured in this study did not yield statistically significant results, the researcher infers that other rhythm systems would likely produce similar student outcomes. Previous research by Tara Pearsall and Brett Allen Janssen highlights that

---

[105] Karageorghis, Lyne, Bigliassi, Vuurst, “Effects of Auditory Rhythm,” 15.

consistency in rhythm instruction is more crucial than the specific system used. Pearsall's rhythm tempo study did not indicate a significant difference in performance accuracy between students who learned and practiced rhythm through the Kodály and Gordon rhythm systems.[106] The data from Janssen's study, which included different rhythm-counting systems for college aural skills students, showed that implementing any rhythm-counting system improves rhythm performance accuracy.[107] Thus, consistency within school districts is essential to minimize student confusion caused by exposure to multiple counting systems aimed at achieving the same objective. Music educators are responsible for maintaining consistency in their instruction and ensuring that students have ample performance opportunities to practice applying a rhythm-counting system to decode challenging rhythms they will encounter throughout their musical careers.

The limited literature and research on rhythm-counting systems underscore the need for further exploration in this area. Rhythm, one of the most fundamental components of musical performance, plays a critical role in students' ability to perform music accurately. Feldman and Contzius state, "Having good rhythm is crucial for all musicians. Indeed, professional orchestral players often report that it is the primary characteristic they look for during auditions. Without it, it is impossible to function effectively."[108] Students must be taught rhythm consistently and effectively from the beginning of their musical education. Teachers must choose the rhythm-counting system they believe will best serve their students, often based on personal preferences or teaching experience, due to the need for comprehensive, research-backed guidance.

---

[106] Pearsall, "Investigating the relationship," 60.

[107] Janssen, "A Preliminary Comparative Study," 62-63.

[108] Feldman and Contzius, *Instrumental Music Education,* 18.

Introducing multiple counting systems provides variety, but more research still needs to support a definitive, pedagogically sound choice for rhythm instruction. As a result, teachers rely on their judgment and experiences. This study did not identify a singular, universally successful rhythm-counting system, and it is likely that other studies may not either. It is possible that teachers have yet to discover the most effective system for their instruction. Therefore, educators must remain open to exploring and experimenting with different rhythm-counting systems to find the one that best supports their students' needs. No conclusive evidence yet points to the most effective system, so teachers are encouraged to continue investigating the various options available for teaching rhythm.

Limitations

This research included several limitations. One of the primary limitations was the variation in the delivery of rhythmic instruction. Three teachers implemented three different rhythm-counting systems in various school settings, introducing variability in the teaching methods and the classroom environments. Additionally, some students within the same school received instruction either during the summer program or the regular school year. These differing learning contexts contributed to varied educational experiences, meaning that students in the summer program may have had different opportunities for rhythm practice and instruction compared to those in the regular school program. These inconsistent learning conditions may have influenced the students' preparation and performance on the post-instruction rhythm assessments. Tammy Fust taught both groups of students in her study, so there was a consistency in teaching styles in the delivery of instruction.[109]

---

[109] Fust, “Syllable Systems,” 27.

The study was conducted across two different school districts, each with distinct performing arts programs, introducing additional limitations. Students in the summer music programs experienced different learning conditions. One summer group received instruction through the Traditional small group lesson approach, while the other group had low enrollment, leading to the consolidation of students who played different instruments. Moreover, the duration and frequency of the lessons varied slightly between the programs. The summer music lessons lasted one hour each day, five days a week, for two weeks. In contrast, during the regular school year, instrumental lessons were 30 minutes long once a week, supplemented by a one-hour full band rehearsal before school each week. These differences in lesson structure and time allocation could have influenced how much practice time students had to prepare for the post-instruction rhythm assessment.

Two elementary school programs involved in this study were within the same district; however, their learning environments differed, with each teacher implementing a different rhythm-counting system. Variations in program structure, lesson frequency, and instructional approaches may have affected the consistency of students' learning experiences and contributed to variability in their performance outcomes.

Additionally, both school programs involved in the study are on Long Island, New York. The researcher worked with whichever beginner band teachers were willing to participate in the research and implemented different rhythm-counting systems in their instruction. Involving two schools from the same geographic region helped and hurt the data analysis. The culture and style of music education are similar in the same region of the country, leading to consistent results. However, the data show statistically significant results if future studies expand to other areas of the country. Tara Pearsall’s rhythm study included seventy-nine elementary schools across South

Carolina.[110] This wide variety of students learning and practicing rhythm systems and the teachers' instructional delivery methods may have helped the study foster statistically significant results.

The same instructor should have also taught the lessons, introducing variability in instructional delivery and pedagogical styles. Differences in pacing, practice frequency, and the presentation of materials could have influenced students' ability to learn and accurately perform rhythms. Each of the three teachers in this study believed that their respective rhythm-counting systems produced the best results for their students, and they maintained the integrity of their teaching practices despite differences in delivery methods. However, as every teacher brings a unique approach to instruction, each student's learning experience is distinct. Consequently, it is only possible to fully replicate the same educational experience for some students, which may have contributed to the variability in their performance outcomes.

All students involved in the study had prior rhythm-counting experience, as they all participated in elementary general music programs where rhythm-counting systems are likely incorporated into their instruction. This prior exposure to rhythm-counting systems may have given some students an advantage in performing the rhythms, particularly if the system used by their elementary music teacher aligned with one of the rhythm systems implemented in this study. As a result, students familiar with the rhythm-counting system used in their instrumental lessons might have had an edge in the post-instruction assessments, given their previous practice with that system. However, the student's prior music education experiences were beyond the researcher's control. Although not all students had identical experiences, they all possessed some level of familiarity with rhythm counting and performance.

---

[110] Pearsall, "Investigating the relationship," 36.

Consequently, students placed in a group where the rhythm-counting system aligned with their previous experiences in elementary general music may have felt more comfortable, potentially influencing their rhythm performance outcomes. This was also the case in Khor, Chan, and Roslan's study on rhythmic accuracy in articulation for brass students in Malaysia. Khor, Chan, and Roslan state, "Kodaly's system remains as the most popular rhythm syllable system used in the US, as well as in others countries including Malaysia."[111] The students in the Malaysian study had previously been exposed to Kodály counting syllables in their elementary general music classes, thereby creating an unavoidable bias in the rhythm study that may have skewed accurate results.

There were several limitations in the results of the paired samples *t*-test. Specifically, the Takadimi post-test variable violated the assumption of normality, which could affect the reliability of the statistical findings. Additionally, twelve outliers were identified in the *t*-test data, indicating that these students did not follow the typical trend observed in the rest of the data. However, given that the study involved 146 students, the small proportion of outliers did not significantly skew the results. Despite the presence of outliers, the *t*-test still indicated a significant difference in student performance on the rhythm assessments, suggesting that the instruction provided through the three rhythm-counting systems led to measurable improvements in student performance.

---

[111] Khor, Chan, and Roslan, "Integrating Rhythmic Syllable," 1383.

Recommendations for Future Research

Further research could expand and refine the findings of this study, contributing to a deeper understanding of rhythm instruction in music education. Specifically, additional studies will benefit the research in the following areas:

1. Limited Research on the Efficacy of Rhythm-Counting Systems: Although rhythm is a foundational component of music, a significant gap exists regarding the impact of various rhythm-counting systems on rhythm performance accuracy. Teacher preference motivates the selection of a rhythm-counting system, and whether specific systems may be more effective for beginning instrumentalists than others remains to be seen. This lack of empirical investigation allows future studies to explore and identify potentially more effective rhythm-counting systems. Such research could contribute to standardizing rhythm instruction practices across school districts globally, promoting greater pedagogical consistency. A universally accepted rhythm-counting system would reduce confusion among students, teachers, and musicians, enhancing rhythm education's overall coherence and effectiveness across diverse educational contexts.
2. Prior Exposure to Rhythm-Counting Systems Among Participants: All beginning instrumental students in this study had previous experience with elementary general music, where they were likely introduced to at least one rhythm-counting system before receiving instruction supplemented by the systems in this study. While the researcher had no control over these prior experiences, a more precise evaluation of the most effective rhythm-counting system would ideally involve groups of students without exposure to any rhythm-counting system. In such an ideal context, where each student begins as a "blank slate," results would

more accurately reflect the efficacy of each rhythm-counting system in enhancing rhythm performance for beginning band students.

3. Geographic and Cultural Limitations of the Study: Two school districts on Long Island, New York, participated in this study, which limits its generalizability to broader educational and cultural contexts. Instrumental music education is practiced globally, often reflecting distinct cultural backgrounds and varied instructional methods. Expanding this research to diverse educational settings worldwide could yield statistically significant, more universally applicable results, enabling music educators in different regions to benefit from findings relevant to their specific contexts. Additionally, future studies could incorporate a broader range of rhythm-counting systems to provide a more comprehensive analysis of instructional effectiveness across diverse pedagogical approaches.
4. Study Scope Limited to Beginning Band Students and Basic Rhythms: The students in this study were beginning band students, and as such, the rhythms evaluated were relatively simple. An essential dimension for future research would be to assess the effectiveness of rhythm-counting systems as students progress from simple to compound meters and encounter increasingly complex rhythmic structures. Many rhythm-counting systems must be more consistent when applied to more advanced rhythms, leading to potential confusion for students and teachers. A follow-up study involving more complex rhythmic patterns and a cohort of intermediate or advanced students could help determine which rhythm-counting system is most effective across varying levels of rhythmic complexity and student experience.
5. Impact of Rhythmic Intervention on Performance, Regardless of System: Although this study did not yield statistically significant differences among the rhythm-counting systems, it

demonstrated that rhythmic intervention enhances rhythm performance. Like learning to read a language, decoding musical notation requires translation mechanisms; rhythm-counting systems are tools to interpret and internalize rhythmic patterns. Further research should investigate whether additional rhythm-counting systems beyond those examined in this study might yield more substantial or statistically significant improvements in rhythm performance. Such exploration could deepen understanding of how rhythm-counting methodologies support musical literacy and aid in developing effective teaching strategies.

Summary

This thesis addresses the need for more clarity among music educators regarding choosing rhythm-counting systems for instructing students. The research underscores the need to identify a system that most effectively supports rhythmic accuracy in beginning band students to establish an instructional approach that could achieve consensus among educators. Rhythm, as a foundational element in music performance, requires precise guidance. However, no standard counting system currently exists; teachers typically rely on personal preference and experience in selecting a method they believe will benefit their students.

This study utilized a quantitative, quasi-experimental design to investigate the effectiveness of three distinct rhythm-counting systems in enhancing rhythm accuracy among beginning band students. Each system was applied in rhythm instruction, followed by pre- and post-instruction assessments to measure improvement. Statistical analyses, including paired samples *t*-tests and ANOVAs, were conducted to compare the effectiveness of each system. Results indicated that rhythm instruction positively influenced student performance across all systems; however, no single counting system demonstrated a statistically significant advantage.

Given these findings, educators are encouraged to experiment with various rhythm-counting approaches to determine the most effective system for their students. Consistency in rhythm instruction is essential, and music educators within the same district benefit from agreeing on a standard rhythm-counting system to optimize student outcomes. While further research may reveal a definitive system that outperforms others, current recommendations support teachers in adopting a system that aligns with their instructional philosophy and remains consistent in its application. Such consistency enables students to develop the ability to decode rhythmic notation accurately, laying a solid foundation for their ongoing musical progression and proficiency in rhythm performance.

Bibliography

Aldrich, James O. *Using IBM SSPS Statistics: An Interactive Hands-On Approach.* Thousand Oaks: Sage Publications, Inc., 2017.

Apel, William. *Harvard Dictionary of Music.* Cambridge: Harvard University Press, 1967.

Bacon, Terence Edward. *A comparison of rhythm syllable systems used in beginning instrumental instruction*. Ann Arbor: Michigan State University ProQuest Dissertations Publishing, 1998.

Bader, Kathleen Ann. "The Effects of the Takadimi Rhythm Method and Folk Songs on the Sight-Reading Abilities of Two High School Choirs." Manitowoc: Silver Lake College ProQuest Dissertation & Theses, 2014.

Bebeau, Muriel J. "Effects of Traditional and Simplified Methods of Rhythm-Reading Instruction." *Journal of Research in Music Education.* (Summer 1982: 107-119). Minneapolis: Sage Publishing, 1982.

Brittin, Ruth V. "Middle School Instrumentalists' Perceptions of Counting Systems." *Council for Research in Music Education.* (Spring 2001: 12-18). Urbana: Univ of Illinois at Urbana-Champaign, 2001.

Byo, James L. "Effects of Barlines, Pitch, and Meter on Musicians' Rhythm Reading Performance." *Journal of Band Research.* (Spring 1992: 34). Troy: ProQuest LLC, 1992.

Campbell, Patricia Shehan and Carol Scott-Kassner. *Music in Childhood: From Preschool through the Elementary Grades.* 4th ed. Boston: Schirmer Cengage Learning, 2014.

Chosky, Lois. *The Kodaly Context: Creating an Environment for Musical Learning.* Englewood Cliffs: Prentice-Hall, 1981.

Colley, Bernadette. "A Comparison of Syllabic Methods for Improving Rhythm Literacy." *Journal of Research in Music Education.* (Winter 1987: 221-235). Montreal: Sage Publishing, 1987.

Dalby, Bruce. "Toward an Effective Pedagogy for Teaching Rhythm: Gordon and Beyond." *Music Educators Journal.* (September 2005: 54-60). Albuquerque: Sage Publishing, 2005.

DeLuca, Christopher and Benjamin Bolden. "Music Performance Assessment: Exploring Three Approaches for Quality Rubric Construction." *Music Educators Journal.* (September 2014: 70-76). Thousand Oaks: Sage Publishing, 2014.

Dunn, Dwayne E. “Effect of Rehearsal Hierarchy and Reinforcement on Attention, Achievement, and Attitude of Selected Choirs.” *Journal of Research in Music Education.* (Winter 1997: 547-567). Tucson: Sage Publishing, 1997.

Egbert, Johnson Blythe. “The Effects of Systematic Rhythm Reading Instruction Versus Rote Rhythm Drill On the Pitch and Rhythm Sight-Singing Performance of High School Choral Ensemble Members.” Columbia: ProQuest Dissertations Publishing, 1990.

Ester, Don P., John W. Scheib, and Kimberly J. Inks. “Takadimi: A Rhythm System for All Ages.” *Music Educators Journal*. (November 2006: 60-65). Reston: MENC: National Association for Music Education, 2006.

Feldman, Evan and Ari Contzius. *Instrumental Music Education: Teaching with the Musical and Practical in Harmony*. New York: Routledge, 2011.

Feldstein, Sandy and John O’Reilly. *Yamaha Band Student: Book 1- Trumpet*. Van Nuys: Alfred Publishing Company, Inc., 1987.

Fust, Tammy Renee. “Syllable Systems: Four Students’ Experiences in Learning Rhythm.” Louisville: Think IR, 2006.

Gage, Stephen Lawrence. “An Analysis and Comparison of Rhythm Instructional Materials and Techniques for Beginning Instrumental Music Students.” Champaign: University at Illinois at Urbana-Champaign ProQuest Dissertations Publishing, 1994.

Gardner, Howard. *The Development and Education of the Mind.* New York: Taylor & Francis Group, 2006.

Goodrich, Kathlene. “Instrumental Connections: Why Can't My Students Count?” *Kodaly Envoy.* Fall 2001: 20). Los Angeles: Organization of American Kodaly Educators, 2001.

Gordon, Edwin E. *Learning Sequences in Music.* Chicago: GIA Publications, 2018.

Gordon, Edwin E. *Rhythm: Contrasting the implications of audiation and notation.* Chicago: GIA Publications, 2000.

Haston, Warren. “Beginning Wind Instrument Instruction: A Comparison of Aural and Visual Approaches.” *Contributions to Music Education.* Hartford: Ohio Music Educators Association, 2010.

Hill, Gloria Lynn. “Teaching Rhythm to Beginning Piano Students: An Analysis of Various Counting Systems and the Integration of Kodály and Orff Rhythm Strategies.” University: The University of Mississippi ProQuest Dissertations Publishing, 2008.

Hoffman, Richard, William Pelto, and John W. White. “Takadimi: A beat-oriented system of rhythm pedagogy.” *Journal of Music Theory Pedagogy*. Norman: The Board of Regents, 1996.

Hom, Candice and David E. Wolf. “Use of Melodies as Structural Prompts for Learning and Retention of Sequential Verbal Information by Preschool Students.” *Journal of Music Therapy*. Stockton: National Association for Music Therapy, Inc., 1993.

Hovey, Nilo M. Hovey. *Rubank Elementary Method Saxophone*. Chicago: Rubank Inc. 1934.

Houlahan, Micheál and Philip Tacka. “Sound Relationships: An Approach to Teaching Rhythm According to the Kodály Concept Using Takadimi Rhythm Syllables.” *Kodaly Envoy.* (Spring 2017: 6-13). New York: Oxford University Press, 2017.

Island Trees Union Free School District: Excellence & Success for All Students. Levittown, 2024. https://www.islandtrees.org

Jacques-Dalcroze, Émile. *Eurhythmics, Art, and Education*. New York: B. Blom, 1972.

Janssen, Brett Allen. “A Preliminary Comparative Study of Rhythm Systems Employed Within the First-Year College Aural Skills Class.” Manhattan: Kansas State University ProQuest Dissertation & Theses, 2017.

Karageorghis, Costas I., Lianne P. Lyne, Marcelo Bigliassi, and Peter Vuurst. “Effects of Auditory Rhythm on Movement Accuracy in Dance Performance.” London: Brunnel University Archive, 2019.

Khor, A.K., C.J. Chan, and S. Roslan. “Integrating Rhythmic Syllable with Tonguing Drills in Elementary Brass Instruments Instruction.” *Pertanika Journals.* Serdang: Universiti Putra Malaysia Press, 2016.

Kinyon, John and Valentine Anzalone. *Breeze Easy Method 2: Tuba.* New York: Warner Bros. Inc., 1983.

Laing, Daniel Robert. “The Effect of Rhythm Pattern Instruction On the Sight-Reading Achievement of Wind Instrumentalists.” Columbia: ProQuest Dissertations Publishing, 2007.

Landis, Beth and Polly Carder. *The Eclectic Curriculum in American Music Education: Contributions of Dalcroze, Kodály, and Orff.* Washington: Music Educators National Conference, 1972.

Lautzenheiser, Tim, John Higgins, Charles Menghini, Paul Lavendar, Tom C. Rhodes and Don Bierschenk. *Essential Elements 2000: Comprehensive Band Method*. Milwaukee: Hal Leonard Corporation, 2004.

Mixon, Kevin. *Reaching and Teaching All Instrumental Music Students.* Plymouth: MENC: The National Association for Music Education, 2011.

O'Reilly, John and Mark Williams. *Accent on Achievement: A comprehensive band method that develops creativity and musicianship.* Van Nuys: Alfred Publishing Company, 1997.

Palkki, Joshua. "Rhythm syllable pedagogy: A historical journey to takadimi via the Kodály method." *Journal of Music Theory Pedagogy*. Nashville: Carolyn Wilson Digital Collections, 2010.

Palmer, Mary. "Relative Effectiveness of Two Approaches to Rhythm Reading for Fourth-Grade Students." *Journal of Research in Music Education.* (Autumn 1976: 110-118). Urbana: Sage Publishing, 1976.

Paney, Andrew S. and Nathan O. Buonviri. "Teaching Melodic Dictation in Advanced Placement Music Theory." *Journal of Research in Music Education.* (January 2014: 396-414). University: Sage Publishing, 2014.

Pearsall, Tara. "Investigating the relationship between tempo consistency and the rhythm syllable systems used during a standardized rhythm performance task." Columbia: University of South Carolina ProQuest Dissertations Publishing, 2009.

Pearson, Bruce. *Standard of Excellence Comprehensive Band Method: Book 1- Trumpet*. San Diego: Neil A. Kjos Music Company, 1993.

Pearson, Bruce and Ryan Nowlin. *Teaching Band with Excellence.* San Diego: Kjos Music Press, 2011.

Port Washington Union Free School District: Our Vision and Mission. Port Washington, 2024. https://www.portnet.org/apps/spotlightmessages/14612

Row, David. "Rhythm Syllable Systems- What to use and why!" Make Moments Matter- A Music Education Website. Kansas City: 2022.

Sheldon, Deborah A., Brian Balmages, Timothy Loest, Robert Sheldon and David Collier. *Measures of Success: A Comprehensive Musicianship Band Method.* Fort Lauderdale: The FJH Music Company Inc., 2010.

Sheldon, Robert, Peter Boonshaft, Dave Black and Bob Phillips, *Sound Innovations for Concert Band Book 1, Trumpet,* (Van Nuys: Alfred Music Publishing, 2010), 11.

Stetson, R.H. "The Teaching of Rhythm." *The Music Quarterly.* (April 1923: 181-190). Oberlin: Oxford University Press, 1923.

Strovas, Scott. “Wayland Baptist University: 3 Great Things About Eastman Counting System.” Targeted News Service. Washington D.C.: Wayland Baptist University School of Music, 2021.

Thrall, C. Eugene. “Teaching Rhythm.” *Music Educators Journal.* (Nov.-Dec. 1963: 20). Akron: Sage Publishing, 1963.

Turner, David. “Seeing Progress with Takadimi.” *Music Educators Journal.* (May 2007: 6). Indianapolis: Sage Publishing, 2007.

Van Nuys, Kelvin, and Homer E. Weaver. "Memory span and visual pauses in reading rhythms and melodies." *Psychological Monographs*. 1943.

Varley Jr., Paul C. “An Analysis of Rhythm Systems In the United States: Their Development and Frequency of Use by Teachers, Students, and Authors; and Relation to Perceived Learning Preferences.” Ann Arbor: Saint Louis ProQuest Dissertations Publishing, 2005.

Walters, Darrel L. and Cynthia C. Taggart. *Readings in music learning theory*. Chicago: GIA Publications, 1989.

Wang, Jin-Hui. *Associative Memory Cells: Basic Units of Memory Trace.* Beijing: Springer Nature Singapore Pte Ltd., 2019.

Warner, Rebecca M. *Applied statistics: From bivariate through multivariate techniques*. Thousand Oaks: Sage Publishers, Inc., 2013.

Appendix A

COOPERATING TEACHER PERMISSION LETTER

July 1, 2024

Removed to protect privacy

Dear

As a graduate student in the School of Music at Liberty University, I am conducting research as part of the requirements for a Doctor of Music Education (DME) degree. The title of my research project is "Easy as 1, 2, 3: An Analysis of Rhythm-Counting Systems and Their Effect on Performance Accuracy in Beginner Band Students." My research aims to explore various rhythm-counting systems and discover which system fosters the most student success for beginner band students.

I request your permission to be a cooperating teacher to conduct my research in the Port Washington Summer Music Program. Participants will be asked to complete two rhythm performance assessments that will be audio-recorded and rhythm-counting worksheets that can supplement rhythm instruction that you already do in your program. As a cooperating teacher, you will present students and their parents with informed consent information before participating. You will also be responsible for audio-recording students on their assessments and instructing them on rhythm through the designated rhythm-counting system. Participation in this study is voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, respond by email to

Sincerely,

Brendan Beiersdorfer
Graduate Student, Liberty University School of Music
Band Teacher, South Side Middle School

Appendix B

CITI TRAINING

CITI PROGRAM

Completion Date 21-Nov-2023
Expiration Date 21-Nov-2026
Record ID 59709718

This is to certify that:

Brendan Beiersdorfer

Not valid for renewal of certification through CME.

Has completed the following CITI Program course:

Social & Behavioral Research - Basic/Refresher
(Curriculum Group)
Social & Behavioral Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Liberty University

CITI
Collaborative Institutional Training Initiative

101 NE 3rd Avenue, Suite 320
Fort Lauderdale, FL 33301 US
www.citiprogram.org

Generated on 27-Jul-2024. Verify at www.citiprogram.org/verify/?wd55d0274-ee41-4bb3-9531-cc82b8c15f24-59709718

Appendix C

PARENTAL CONSENT

Title of the Project: Easy as 1, 2, 3: An Analysis of Rhythm-Counting Systems and Their Affect on Performance Accuracy in Beginner Band Students
Principal Investigator: Brendan Beiersdorfer, Doctoral Candidate, School of Music, Liberty University
Participating Band Teachers: *Removed to protect privacy*

Invitation to be Part of a Research Study

Your child is invited to participate in a research study. To participate, he or she must be a beginner band student enrolled in the summer music program. Taking part in this research project is voluntary. Please take time to read this entire form and ask questions before deciding whether to allow your child to take part in this research project.

What is the study about and why are we doing it?

The purpose of the study is to analyze the effectiveness of various rhythm-counting systems. There are several systems that exist, and this study is aimed to determine which system is best suited for beginner band students.

What will participants be asked to do in this study?

If you agree to allow your child to be in this study, I will ask him or her to do the following:

1. Participate in two in-person audio-recorded performance assessment on their instrument of a two-measure excerpt. The recording process will take no longer than two minutes to complete. One recording will be completed towards the beginning of the summer music program prior to receiving rhythmic instruction, and the other recording will be completed towards the end of the program after receiving rhythmic instruction.
2. Receive rhythmic instruction supplemented by a rhythm-counting system and complete rhythm-counting worksheets by writing in corresponding syllables to different parts of rhythms. The worksheet will take approximately five minutes to complete.

How could participants or others benefit from this study?

The direct benefits participants should expect to receive from taking part in this study are receiving rhythmic instruction and learning how to better decode music notation and gaining performance experience on their instruments. Benefits to society include potentially discovering a uniformly effective rhythm-counting system to be implemented for all beginner band students.

What risks might participants experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks your child would encounter in everyday life. The risks involved in this study include the possibility of psychological stress from taking recordings of them performing rhythms they may not yet completely understand. To reduce risk, the study team will monitor participants and allow

students all the time they need to record their performance assessments should they become nervous.

How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researchers will have access to the records.

- Participant responses will be kept confidential by replacing names with pseudonyms.
- Data collected from your child may be used in future research studies and shared with other researchers. If data collected from your child is reused or shared, any information that could identify your child, if applicable, will be removed beforehand.
- Data will be stored on a password-locked computer. After three years, [all electronic records will be deleted and all hardcopy records will be shredded.
- Recordings will be stored on a password-locked computer for three years and then deleted. Only the researcher and members of the study team will have access to these recordings.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to allow your child to participate will not affect your or his or her current or future relations with your school district or Liberty University. If you decide to allow your child to participate, he or she is free to withdraw at any time without affecting those relationships.

What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw your child from the study or your child chooses to withdraw, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw him or her or should your child choose to withdraw, data collected from your child will be destroyed immediately and will not be included in this study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Brendan Beiersdorfer. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at [redacted] or [redacted] You may also contact the researcher's faculty sponsor, Dr. Nathan Street, at [redacted]

Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is [redacted]

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are

those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to allow your child to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

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

☐ The researcher has my permission to audio-record my child as part of his/her participation in this study.

_____

Printed Child's/Student's Name

_____

Parent/Guardian's Signature Date

Appendix D

CHILD ASSENT

Child Assent to Participate in a Research Study

What is the name of the study, and who is doing the study?
The name of the study is "The Rhythm-Counting System Experiment" and the person doing the study is Brendan Beiersdorfer, a music teacher from another school.

Why is Mr. Beiersdorfer doing this study?
Mr. Beiersdorfer wants to know which rhythm-counting system helps beginner band students learn the best.

Why am I being asked to be in this study?
You are a beginner band student and you can help Mr. Beiersdorfer complete his research.

What will happen if I decide to be in the study, and how long will it take?
If you decide to be in this study, you will play two rhythm tests on your instrument and fill out rhythm worksheets for practice. The playing tests will take about two minutes each and the worksheet will take about five minutes.

Do I have to be in this study?
No, you do not have to be in this study. If you want to be in this study, then tell your summer music teacher. If you do not want to, it is OK to say no. The researcher or your music teacher will not be angry. You can say yes now and change your mind later. It is up to you.

What if I have a question?
You can ask questions at any time. You can ask now. You can ask later. You can talk to your music teacher. If you need help understanding something, please ask your music teacher to explain it again.

Signing your name below means, you want to be in the study.

_____

Signature of Child/Witness Date

Appendix E

INSTRUMENTS

MISTAKES MADE BY STUDENTS DURING FIVE WEEKS OF LESSONS[112]

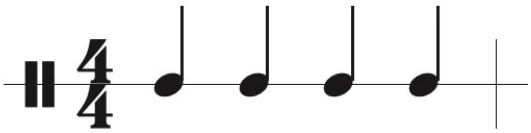
	Student A (female, clarinet) Takadimi	Student B (male, alto sax.) Takadimi	Student C (female, alto sax.) 1-e-&-a	Student D (male, clarinet) 1-e-&-a
H	8	12	6	6
P	13	10	8	6
W	10	5	11	18
U	6	5	5	7
S	3	9	9	10
I	4	8	4	10
Total	**44**	**49**	**43**	**57**

[112] Fust, "Syllable Systems: Four Students' Experiences in Learning Rhythm," 34.

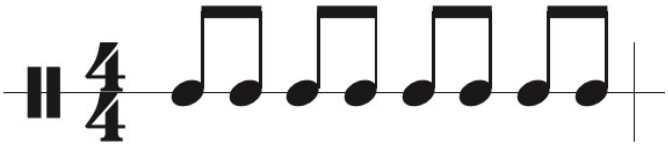
Appendix F

INSTRUCTIONAL MATERIALS

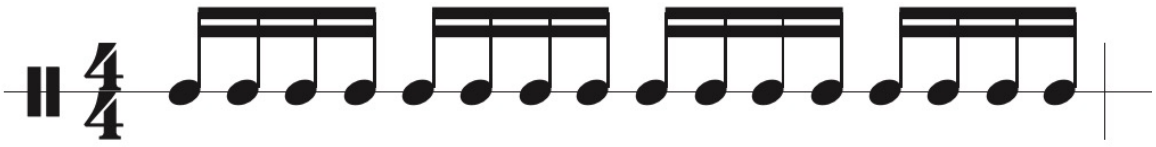
KODÁLY COUNTING SYSTEM



Ta Ta Ta Ta

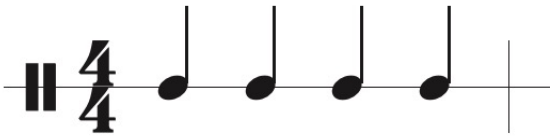


Ti ti Ti ti Ti ti Ti ti



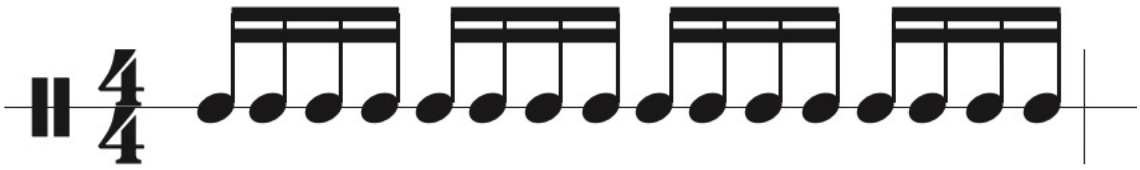
Ti ri ti ri Ti ri ti ri Ti ri ti ri Ti ri ti ri

TRADITIONAL COUNTING SYSTEM



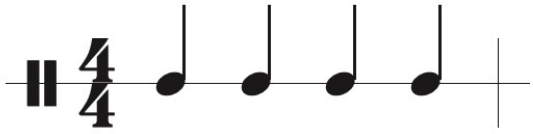
1 2 3 4

1 + 2 + 3 + 4 +

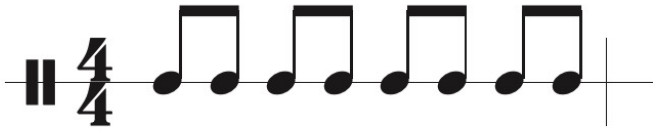


1 e + a 2 e + a 3 e + a 4 e + a

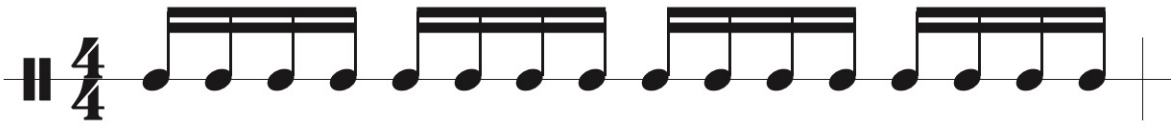
TAKADIMI COUNTING SYSTEM



Ta Ta Ta Ta



Ta di Ta di Ta di Ta di

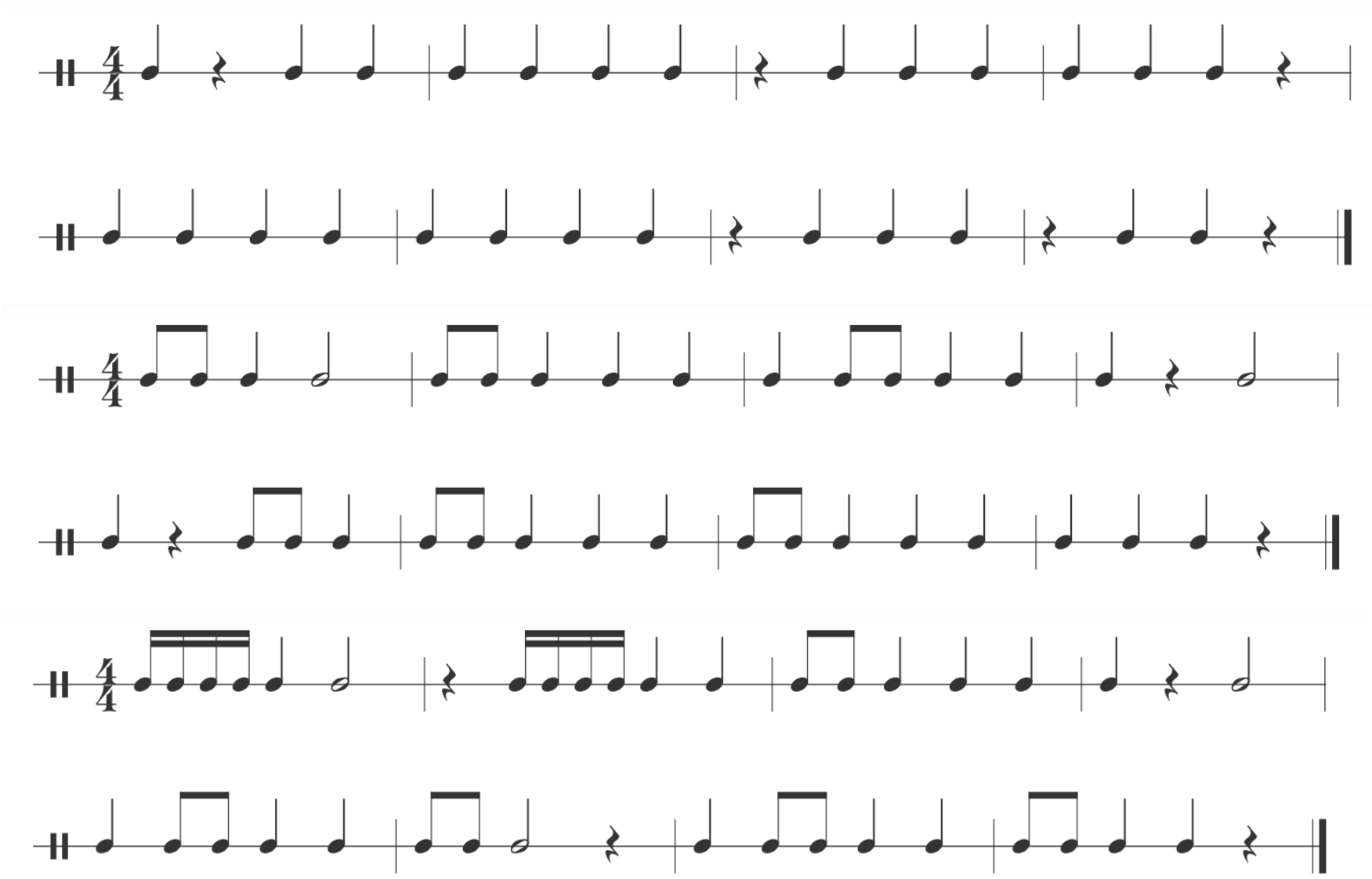


Ta ka di mi Ta ka di mi Ta ka di mi Ta ka di mi

PRE-INSTRUCTION RHYTHM PERFORMANCE ASSESSMENT

POST-INSTRUCTION RHYTHM PERFORMANCE ASSESSMENT

PRACTICE RHYTHM SAMPLES (CREATED VIA SIGHTREADINGFACTORY.COM)



Appendix G

LIBERTY UNIVERSITY IRB APPROVAL

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

July 22, 2024

Brendan Beiersdorfer
Nathan Street

Re: IRB Approval - IRB-FY23-24-1916 Easy as 1, 2, 3: An Analysis of Rhythm-Counting Systems and Their Affect on Performance Accuracy in Beginner Band Students

Dear Brendan Beiersdorfer, Nathan Street,

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the following date: July 22, 2024. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. 45 CFR 46.101(b)(2) and (b)(3). This listing refers only to research that is not exempt.)

For a PDF of your approval letter, click on your study number in the My Studies card on your Cayuse dashboard. Next, click the Submissions bar beside the Study Details bar on the Study Details page. Finally, click Initial under Submission Type and choose the Letters tab toward the bottom of the Submission Details page. Your stamped consent form(s) and final versions of your study documents can be found on the same page under the Attachments tab. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, PhD, CIP
Administrative Chair
Research Ethics Office