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A COMPARISON OF THE EFFECTS OF TWO TYPES OF MOVEMENT INSTRUCTION ON THE DEVELOPMENTAL RHYTHM APTITUDE AND RHYTHM ACHIEVEMENT OF KINDERGARTEN STUDENTS

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By

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ABSTRACT

A COMPARISON OF THE EFFECTS OF TWO TYPES OF MOVEMENT INSTRUCTION ON THE DEVELOPMENTAL RHYTHM APTITUDE AND RHYTHM ACHIEVEMENT OF KINDERGARTEN STUDENTS

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The purpose of this study was to compare the effects of movement instruction that included continuous flowing movement with the effects of movement instruction that only focused on beat on the rhythmic aptitude and achievement of kindergarten students. The problems of the study compared the rhythm aptitude gains, beat synchronization ability, and rhythm chant performance ability of kindergarten students in the two treatment groups.

Two intact kindergarten classes (n=27) were assigned to the combined flowing and beat movement treatment group, and 2 classes (n=23) were assigned to the beat-only treatment group. All participants were given a pre-test of the *Primary Measures of Music Audiation (PMMA)* before instruction began.

Instruction consisted of one 30-minute class session each week for 23 weeks. One treatment group experienced a variety of activities featuring continuous, flowing movements in addition to movements to beat. The other treatment group experienced movement activities exclusively to beat. After the treatment period, *PMMA* was re-administered, and video and audiotaped beat synchronization and chant performances were rated by two independent judges using researcher-designed rating scales.

There were no significant differences between the two treatment groups for any of the criterion measures employed.

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CHAPTER ONE

INTRODUCTION

Music educators have considered movement to be a central component of the music education of children. Common to the pedagogical approaches of Dalcroze, Orff, Kodaly, and Gordon is the idea that children should be encouraged and instructed to respond kinesthetically to the rhythmic elements of music. The philosophy and techniques of Laban, a movement and dance educator, have also influenced music educators, notably Nash and Gordon (Nash, 1974; Gordon, 1997a, 1997b), to stress the importance of movement in the holistic music education of children. Common to all is the belief that movement experiences will enhance children's ability to perform, discriminate among, and understand the rhythmic and even stylistic aspects of music. Despite the shared conviction that movement should be central to music education, the aforementioned educators, as well as other members of the music education community, have widely varying conceptions of what constitutes appropriate and beneficial movement instruction. Research is needed to examine the various aspects of rhythmic movement and provide guidance for teachers as they design and implement movement curricula. With this goal in mind, the current research begins by summarizing the views of prominent music educators on the subject of movement in music education.

Dalcroze

Emile Jacques-Dalcroze, a Swiss music educator, developed an approach to music education based on the concept that "execution should precede perception and criticism" (Jacques-Dalcroze, 1921, p.81). For Dalcroze, the body served as a mediator between actual musical sounds and the cognitive understanding of those sounds (Shehan, 1987). Central to the Dalcroze approach is the practice of Eurythmics, in which students are taught to respond to the various elements of music, such as beat, meter, phrase, and dynamics, with movements of the whole body. By practicing Eurythmics, children are led to develop a "mastery of movements in relation to energy, space, and time," and an internal sense of rhythm (Jacques-Dalcroze, 1921, p. 83). "The muscular system perceives rhythms. By means of repeated daily exercises, muscular memory may be acquired, conducing to a clear and regular representation of rhythm" (Jacques-Dalcroze, p. 80). Dalcroze believed that each child possesses an internal, instinctive sense of time as evidenced by the regularity of the heartbeat, the pattern of inhalation and exhalation in breathing, and the regular, metrical division of time inherent in the walking gait. Dalcroze Eurythmics uses walking as the point of departure in the rhythmic training of children.

Orff

According to Carl Orff, "Elemental music is never music alone but forms a unity with movement, dance, and speech" (Keetman, 1970/1974, p. 107). Orff perceived this essential unity between movement and music in the traditional musics of non-Western cultures and regretted the disconnection that was manifest in Western art music. Orff's approach to the rhythmic training of children was strongly influenced by the work of Dalcroze (Shehan, 1987). The young Orff visited Dalcroze's institute for dancers and

musicians in Hellerau, Germany, a visit that was instrumental in the formation of the Schulwerk. Like Dalcroze, Orff believed experience should precede understanding. Thus, in an Orff approach, the child is led to experience rhythm through speech and movement that is familiar and natural to the child's world (Keetman, 1970/1974). Orff Schulwerk teaches children a movement vocabulary that includes walking, stamping, patting, clapping, snapping, skipping and other locomotor and non-locomotor movements. The focus is on teaching children to move with an accurate sense of rhythmic pulse, leading to more rhythmically coordinated ensemble participation. The development of a steady sense of beat through movement is central to the Orff curriculum.

Kodaly

Zoltan Kodaly devoted much of his life to re-invigorating the musical education system of his native Hungary. His efforts inspired many other educators and musicians to contribute to what has become known as the Kodaly Method, a constantly evolving approach to children's music education based on Kodaly's philosophies. The goals of the approach are "to aid in the well-balanced social and artistic development of the child, and to produce the musically literate adult" (Choksy, 1974, p. 15). A fundamental tenet of the Kodaly Method is the belief that children first should be educated in their musical "mother tongue," that is, the folk music of their culture. Although not specifically stressed by Kodaly himself, movement experiences have become an important part of the Kodaly approach and can be categorized as two types. The first, influenced by Dalcroze and similar to Orff methodology, are movements designed to develop children's beat competence. Children are encouraged to move to the beat of their own singing, and later, these movement experiences are connected to the teaching of music notation. Thus,

similar to Dalcroze methodology, Kodaly teachers encourage the experiencing and feeling of concepts before they are labeled or formally taught. The other category of movement experiences in the Kodaly approach is the teaching of the singing games and folk dances of children's native culture. Besides strengthening the child's rhythm skills and sense of beat, such activities serve as ends in themselves, since the transmission of native musical culture is a primary goal of the Kodaly method (Choksy, 1981).

Laban

Although not a music educator himself, Rudolph von Laban developed concepts of movement and dance instruction that have proven influential and useful to music educators. Primarily a dance educator, Laban emphasized the central role of movement in the daily lives of persons, and he believed that movement provides an important link between the mind and body (Jordan, 1989). For Laban, movement could be categorized by the quality of the effort extended by the mover. He labeled these effort elements Time, Space, Weight, and Flow. Laban encouraged movement instructors to provide experiences for students with various combinations and characteristics of these effort elements. Such experiences would provide a vocabulary of movement that could be internalized by students and later recalled during movement, dance, or music experiences, as well as enhancing one's day to day life (Chernohorsky, 1991). These internalized qualities of movement can be directly related to the kinesthetic feelings required of expressive music performance. Laban's movement ideas have been incorporated into the music education curricula espoused by prominent music educators. The "creative approach" to music education advocated by Nash relies heavily on Laban's conception of effort elements (Nash, 1974). She considered experiences in movement, specifically

experiences focused on various combinations of Laban effort elements, to contribute immeasurably to children's musical development. "Therefore, the direct and natural path for the child's understanding of music and musical form, and his development of musicality, muscular coordination and freedom of self-expression, lies in movement...There are different effort elements (weight, space, time and flow) in movement which vary according to man's different attitudes, reasons, purpose and intent. Children become aware of these elements through a deliberate experiencing of these motion factors (Nash, 1974, p. 80). Gordon's conception of rhythm education was also heavily influenced by the work of Laban (Gordon, 1997a, 1997b). His ideas will be discussed in depth.

Gordon

Gordon has developed a comprehensive Music Learning Theory that provides a description of how music is processed in the brain and how children's musical learning might be guided. Central to Gordon's theory is the concept of audiation (Gordon, 1997a). Audiation involves assimilating and comprehending music when the actual sound is no longer or never was present. Audiation in music is analogous to thinking in language. As one thinks in language he or she understands the meaning of the words that form thoughts; likewise, when music is audiated, its syntactical musical meaning is comprehended on some level. Just as one's ability to think grows in complexity with age, maturation and experience, one's audiation ability may likewise expand in response to musical experiences and appropriate formal and informal instruction in music (Gordon, 1997a). An individual with more developed audiation abilities is able to bring more meaning to music that he is listening to, performing, composing, improvising, and

reading in notation. To Gordon, the role of the music teacher is to guide students to develop their audiation ability to the fullest extent allowed by their musical aptitudes.

Music Aptitude

Central to Gordon's theory of music learning is his conception of music aptitude. Gordon theorizes that all persons are born with an innate potential to achieve in music. This aptitude for music is highly variable from individual to individual (Gordon, 1997a). One's aptitude is multi-dimensional in that one can have a high level of tonal aptitude while at the same time having a low level of rhythm aptitude. Also significant to the music educator is Gordon's identification of developmental aptitude as distinguished from stabilized music aptitude (Gordon, 1997a). Gordon hypothesizes that at birth, a child possesses his or her highest level of music potential, after which the child's aptitude fluctuates, depending on the quality of that child's music environment, until it stabilizes at about age nine. If a child is immersed in a music-rich environment and is given quality instruction in music, the decline in his or her aptitude after birth can be slowed. A child's developmental music aptitude can even show positive growth with appropriate instruction (although Gordon believes that the level of aptitude at birth will not be surpassed) when the child's aptitude is still in the developmental stage. Thus, a child's early musical experiences are crucial in determining his or her future musical achievement.

Preparatory Audiation

In his application of Music Learning Theory to early childhood, Gordon describes three types and seven stages of preparatory audiation that children pass through as they are acculturated in, learn to imitate, and finally are able to assimilate the musical syntax of their culture (Gordon, 1997b). The types and stages of preparatory audiation are

outlined in Table 1. As children move through these stages of musical development, they gradually internalize the musical syntax of their culture as they experience and experiment with musical sounds. The musical responses of children in preparatory audiation have been described by Gordon as "music babble" (Gordon, 1997b).

Table 1

TYPES AND STAGES OF PREPARATORY AUDIATION

TYPES	STAGES
1. ACCULTURATION: Birth to age 2-4: Participates with little consciousness of the environment.	1. ABSORPTION: Hears and aurally collects the sounds of music in the environment.
	2. RANDOM RESPONSE: Moves and babbles in response to, but without relation to, the sounds of music in the environment.
	3. PURPOSEFUL RESPONSE: Tries to relate movement and babble to the sounds of music in the environment.
1. IMITATION: Ages 2-4 to 3-5: Participates with conscious thought focused primarily on the environment.	1. SHEDDING EGOCENTRICITY: Recognizes that movement and babble do not match the sounds of music in the environment.
	2. BREAKING THE CODE: Imitates with some precision the sounds of music in the environment.
2. ASSIMILATION: Ages 3-5 to 4-6: Participates with conscious thought focused on the self.	1. INTROSPECTION: Recognizes the lack of coordination between singing, chanting, breathing, and movement.
	2. COORDINATION: Coordinates singing and chanting with breathing and movement.

(Gordon, 1997b, p. 33)

Music Babble

Music babble responses do not reflect an understanding of music syntax on the part of the child, but represent random, purposeful, or imitative responses to a music stimulus that is not yet understood through audiation. Music babble corresponds closely to the language babble behavior of infants. As babies become acculturated to the language environment that surrounds them, they use babble as a tool to "play" with language until they are able to break the language code and communicate verbally (Taggart & Gouzouasis, 1995). Similarly, children play with the tonal and rhythmic components of music through both verbal and kinesthetic responses. Typically, movement responses are the first to appear and represent the most pervasive form of babble response (Hicks, 1993). A child's emergence from music babble and the period of preparatory audiation is heralded by his or her ability to sing in tune with a sense of tonality and perform rhythmically with steady tempo and a sense of meter. These musical responses are outward signs of the inner growth of audiation ability. The age at which children emerge from music babble is highly variable and dependent on the interactions between the child's music aptitude and the quality of his or her musical environment. Since most children are not provided with a musical environment that is of comparable richness to the language environment in which they are immersed, it can be expected that many children will enter school while still passing through the preparatory audiation stages. With this in mind, it is important that teachers of beginning elementary school students provide ample informal guidance to help such children emerge from music babble. For Gordon, the goal of early childhood music education is to guide children through the stages of preparatory audition by providing them with a rich musical

environment and by encouraging their music babble responses through instruction. With such guidance, students can begin to reach their audiation potential.

Gordon's Incorporation of Movement

Gordon emphasizes the central role of movement in the development of children's ability to audiate rhythmically (Gordon, 1997a, 1997b, 2000). To Gordon, the understanding of rhythm cannot be separated from the kinesthetic "feeling" of rhythm. "Rhythm is movement and cannot be understood apart from movement as it relates to breathing. Thus, rhythm, movement, and breathing are inseparable. Rhythm must be felt--it only begs the question to intellectualize about it" (Gordon, 2000, p. 2). This view echoes Dalcroze's conception of movement as an intermediary between the sound of music and the cognitive understanding of it. Movement is especially essential to the informal guidance appropriate for young children passing through the stages of preparatory audiation. Before a child begins to vocalize rhythmically, his or her rhythmic babble responses will consist of various types of movement. As the child matures, he or she will begin to coordinate her movement with his or her breathing and vocal babble (Reynolds, Valerio, Bolton, Taggart & Gordon, 1998). Since such natural responses tend to be unrelated to the beat of music stimuli, Gordon (1997b) stresses that informal movement guidance should proceed from these natural responses and focus on the modeling and training of smooth, continuous movement that is free from tension.

> The ability to move is necessary for learning to be rhythmical, and to learn rhythm, movement must be of the continuous, sustained type. Whereas the adult emphasizes time and space for fine motor movements in daily life and seldom considers weight and flow, young children intuitively and initially address

> themselves to weight and flow because so much of their focus is on locomotion, on learning to roll over, crawl, walk, skip, or hop, for example. When children are guided to follow their early natural inclination and not forced to engage consciously in moving that involves time and space, they will then be able to develop the necessary rhythm skills to acquire musicianship in its broadest sense. (p. 83)

Gordon's statement that young children demonstrate a natural inclination to express weight and flow through non-discrete movement (movement that does not conform to beat or pulse) is supported by studies undertaken by Moog (1968/1976) and Hicks (1993). Moog observed the responses to various musical stimuli of 500 children with ages ranging from birth to six years. The stimuli included songs, chants, percussion ensembles, instrumental compositions, and sound assemblages that he termed cacophonies. Moog noted the earliest movement responses of children at the age of approximately six months. These earliest responses involved the elements of flow and weight consisting of whole body swaying from side to side and bouncing up and down. Throughout the early childhood period observed by Moog, children's movement responses could be primarily characterized as experiencing flow and weight in a variety of ways. Movements included continued swaying and bouncing, conducting movements with arms, kicking, rocking from leg to leg while standing, swaying and nodding the head, and spinning in a circle. While repetitive motions were common among the observed children, movements were rarely related to the pulse of the music. Not until age 5 or 6 did children begin to consistently exhibit beat-synchronized movement. Moog interpreted the appearance of clapping responses at this age as a product of socialization

in nursery school or kindergarten. Even at this age, a minority of children displayed beat competency through movements with consistent accuracy. Moog's descriptions of his sample population supports Gordon's assertion that whole body movement combining the elements of flow and weight is the natural inclination of young children who are hearing musical performances.

Hicks (1993) observed the responses of children ages 6 to 14 months who were exposed to an early childhood music curriculum based on Gordon's Music Learning Theory. Eight children were selected from 22 who participated in weekly 35-minute sessions over a 20-week period. Three observers viewed videotapes of these children, and any responses to the musical stimuli were noted. The curriculum for the classes included singing and chanting without text in a variety of tonalities and meters. The instructor and caregivers modeled relaxed, free-flowing movements to accompany their singing and chanting. Many of the movement responses demonstrated by this small sample of children corresponded with the movement types noted by Moog. Hicks characterized movement responses as non-pulsating, pulsating, or miscellaneous (extraneous and probably not music-related.) Many of the movements were repetitive in character and made use of the elements of flow and weight: rocks and sways hips, sways torso from side to side, rocks forward and backward, swings arm, twists torso and swings arms, pats side with arms while standing. Hicks did observe movements that corresponded to the beat of the music stimulus, but such movements were less frequent than other non-beat synchronized movements. The subjects of the Hicks study were clearly experimenting with the element of weight, at times connected with the feeling of flow.

Gordon's advocacy for the teaching of flowing, non-discrete movement with young children reflects his view of age-appropriate instruction. In Gordon's view, most young children have not reached a level of physical maturity that will enable accurate beat keeping. Since children may lack the necessary motor skills, teaching beat will often prove ineffective and may lead to frustration and rigidity on the part of the child. To Gordon, the combination of flowing movement and rhythmic chanting will best develop the rhythmic understanding and feeling of children until they reach a level of motor development during which steady beat keeping can be achieved. The experience of weight and flow is seen as providing excellent preparation for future rhythmic development.

Besides potentially lacking the physical coordination to maintain a steady beat, young children may lack the rhythmic audiation capacity that is, in Gordon's view, a necessary prerequisite for accurate rhythmic performance. To Gordon, rhythmic audiation, or, alternatively, the ability to think and image rhythm, is anchored in the ability to perceive the metrical syntax of music. Persons who are able to perceive and kinesthetically feel the onward flow of macrobeats and their regular or irregular divisions into duple or triple microbeats in music have developed the readiness to perform music with rhythmic understanding. Gordon holds that the development of rhythmic audiation is essential if one is to perform music with consistent meter and tempo. To Gordon, teaching students to move to beat before they are able to audiate beat is unlikely to result in optimum rhythmic development (Gordon, 1997b).

Gordon's conception of informal movement instruction is strongly influenced by the Laban effort elements of Space, Time, Weight, and Flow, especially emphasizing the

element of flow (Reynolds, et al., 1989). Gordon encourages parents and teachers to model relaxed, flowing, continuous movement using the entire body. Since it is believed that future rhythmic achievement is dependent on children's ability to move in this manner, it is essential that children learn to move with continuous flow before they are encouraged to move to beat. Gordon holds that a child will have difficulty sustaining a consistent tempo in performance unless he or she can internalize the feeling of flow through experience in movement activities (Gordon, 1997b). In addition to being foundational to a child's rhythmic development, smooth, flowing movements incorporating different feelings of weight, are also believed to contribute to the expressive qualities of a child's musical responses and future musical performances (Reynolds, et al., 1998). As children progress into the later stages of preparatory audiation, Gordon does recommend that teachers and parents to help children kinesthetically experience the feeling of beat without tension, and he encourages movement to beat. However, moving to beat is always connected to the feeling of continuous flow that underlies musical pulse. This emphasis on free flowing, continuous movement at the root of children's rhythmic development distinguishes Gordon's approach from the methodologies of Dalcroze, Orff, and Kodaly, in which moving to beat is central and foundational.

Statement of Purpose

With the goal of improving music instruction, the purpose of this research is to compare the effects of movement instruction that includes continuous flowing movement with the effects of movement instruction that only focuses on beat on the developmental aptitude and rhythmic achievement of children.

Problems of the Study

The problems of this study will be (a) to compare the gains in developmental rhythm aptitude of kindergarten students who are given informal guidance in continuous flowing movement in addition to being taught to move to beat with the gains in developmental rhythm aptitude of kindergarten students who are only taught to move to beat, (b) to compare the beat synchronization ability of kindergarten students who are given informal guidance in continuous flowing movement in addition to being taught to move to beat with the beat synchronization ability of kindergarten students who are only taught to move to beat, and (c) to compare the rhythm chant performance ability of kindergarten students who are given informal guidance in continuous flowing movement in addition to being taught to move to beat with the rhythm chant performance ability of kindergarten students who are only taught to move to beat.

CHAPTER TWO

RELATED RESEARCH

Three main streams of inquiry are related to and have informed the present study. Several studies have examined the concept of developmental music aptitude and the effect of instruction on aptitude. Also germane to the present research are studies exploring the effect of instruction on the development of rhythmic skills, especially instruction that features kinesthetic movement experiences. The third branch of inquiry to be discussed includes studies by Kim (2000), Jordan (1986), Chernohorsky (1991), and Blesedell (1991). These researchers have examined the effects of Laban-based, non-discrete movement on music aptitude and achievement.

Research on Developmental Music Aptitude

Research has supported Gordon's concept of developmental music aptitude, suggesting that music aptitude can be positively affected by instruction. As discussed in Chapter 1, Gordon theorizes that music aptitude, one's potential for achievement in overt musical behaviors, is developmental in nature during the years prior to age nine. Gordon designed the *Primary Measures of Music Audiation (PMMA)* (Gordon, 1986a) as a test battery designed to measure developmental music aptitude. Research has tended to validate Gordon's (1980) findings that *PMMA* scores are sensitive to fluctuations in music aptitude due to instruction and other environmental influences.

Flohr (1981) undertook a study to determine whether a short period (12 weeks) of music instruction would effect positive change in the *PMMA* (Gordon, 1986a) scores of five-year-old children. The 29 research participants were divided into three groups: the first received instruction based on Orff Schulwerk instrumental improvisation techniques, the second group experienced an eclectic curriculum including singing, percussion instrument playing, expressive movement, dance, and singing games, while the control group received no music instruction. Flohr discovered significant gains in the music aptitude scores of the two groups that received music instruction, while the control group showed a non-significant negative trend. Because there was no difference between the two groups who received music instruction, Flohr was not able to recommend either instruction approach as superior; yet, because the groups who received music instruction had greater gains in aptitude then the control group, he concluded that *PMMA* test scores can be affected by instruction. He interpreted his results as being supportive of the concept of developmental music aptitude.

Although Flohr found that a 12-week instruction period could result in significantly improved *PMMA* scores, the present study uses a longer instruction period of 23 weeks. While Flohr only studied music aptitude, the present study also examines music achievement, namely children's ability to move to beat and perform rhythmic chants. The present study also shares a similar sample population, kindergarten children, although the present study will use a slightly larger sample size then Flohr's 29 students. Since Flohr demonstrated that music instruction led to significant gains in aptitude, whereas no instruction did not, the present study did not include a control group receiving

no instruction. Instead, the present study contrasts two approaches to rhythmic movement instruction.

Moore (1984) compared the effects of two teaching approaches as well as no instruction on the rhythmic and overall aptitude levels of second and third grade children. The experimental group received special rhythm and movement lessons based on Orff Schulwerk techniques, combined with the movement approach of Phyllis Weikart, and informed by Gordon's skill and content learning sequences. The first control group received traditional instruction consisting primarily of singing using standard elementary school music textbooks, while the final group did not receive school music instruction. Following the instruction period, Moore found a significant increase in rhythm aptitude as measured by *PMMA* (Gordon, 1986) in the experimental group. Neither control group showed significant change. Moore did not find significant increases in overall music aptitude in any of the three groups.

The Moore study reinforces Gordon's concept that music aptitude for children is fluid and responsive to instruction. Since the lessons used with the experimental group were based heavily on motor responses to rhythm in the form of body movement and instrument playing, the study suggests that such a kinesthetic approach can encourage a positive trend in rhythmic aptitude scores. The current study also examines the effect of instruction on the rhythmic aptitude of students, but, in contrast to the Moore study, it compares two different types of movement instruction. The present study also includes instruction in continuous flowing movement, a technique not included in Moore's curriculum. The current study also examines the effect of movement instruction on

younger children than those included in the Moore study, since the aptitude of younger children is thought to be more malleable and more easily influenced by instruction.

In the Moore study, the experimental group heard and chanted rhythm patterns in both duple and triple meters in addition to movement activities. Pattern instruction followed Gordon's skill learning sequence, and patterns were performed both on neutral syllables and with rhythm solfege. It is probable that this sequential pattern instruction contributed to the rhythmic aptitude of the research participants. In the current study, both experimental groups received similar sequential pattern instruction to ensure that the treatment of different movement approaches is the sole variable.

Research by Taggart (1997) provides additional empirical evidence that instruction can have a positive effect on music aptitude. The sample group for the study consisted of 138 at-risk children enrolled in Lansing, MI schools. The students were instructed as intact classes for two, twenty-minute periods per week for the duration of a school year, with a curriculum based on Gordon's Music Learning Theory. Students experienced a variety of singing, chanting, and movement experiences, as well as tonal and rhythm pattern instruction in major and minor tonalities and duple and triple meters. Pre- and post-test administrations of *Audie* (Gordon, 1989), a music aptitude test for pre-school children, and *PMMA* (Gordon, 1986) found significant growth in music aptitude for all ages, with especially strong gains for the younger participants. Taggart administered the aptitude tests again following a summer hiatus, finding that the gains in aptitude resisted extinction in the absence of instruction. When these fall test results were compared with pre-tests of the same age group from the preceding fall, Taggart was able

to conclude that the increased music aptitude of students with one year of instruction could not be accounted for by growth and maturation alone.

DeYarmen and Schleuter (1977) and Morgan (1996) have reported research results that seem to contradict the preceding studies. DeYarmen and Schleuter (1977) found that children who experienced music instruction in kindergarten through grade 4 demonstrated non-significant change in music aptitude measures. These findings led the researches to suggest that music aptitude stabilizes at ages 5 or 6, since older students failed to demonstrate improvements. However, since this study was undertaken before the development of *PMMA* and instead made use of Gordon's *Music Aptitude Profile* (Gordon, 1965), an aptitude test that is designed to measure the stabilized music aptitude of older children and adults and is not a valid test of developmental music aptitude, the validity of this research is questionable. (Gordon, 1980) Additionally, the lack of growth in music aptitude could have been attributable to poor quality of instruction or inadequate curricular content.

Morgan (1996) compared five different instructional approaches and their effects on the rhythmic aptitude of second grade students. He found no significant growth in music aptitude scores for any of the treatment groups. Morgan's results can be called into question due to the short, eight-week instruction period. Morgan also used the *Intermediate Measures of Music Audiation (IMMA)* (Gordon 1986b) an aptitude test that is designed to show finer distinctions in groups in which more than half of the children have high aptitude. (Gordon, 1986b) This may not have been an appropriate criterion measure for this comparison. Once again, the quality of instruction experienced by the treatment groups may also have contributed to the lack of aptitude improvement.

The studies discussed here have tended to support Gordon's assertion that the music aptitude of young children can fluctuate in response to environmental influences. Since it has been shown that instruction in music can have a positive impact on a child's future potential to achieve in music, it is important for research to clarify the best approaches for delivering this instruction. To this end, studies have been undertaken to explore the use of movement as a component of music instruction. These studies suggest that movement can play an important role in furthering the development of rhythmic skills.

The Effect of Movement Instruction on Rhythmic Achievement

As previously discussed, many prominent music educators have suggested that movement should be a key component in the rhythmic education of children. Researchers have looked for evidence that movement instruction will improve the rhythmic skills of students. The conclusions drawn from this research have been contradictory. Weikart (1982), Burnett (1983), High (1987), and Rohwer (1998) found that instruction that included movement experiences did positively effect rhythmic achievement, while Jersild & Bienstock (1935), Groves (1969), and Rainbow (1981) could not find evidence to support that instruction significantly improved various rhythmic skills

Weikart (1982) studied the rhythmic skills of children and concluded that rhythmic instruction can have a positive effect on the development of these skills. Weikart considers the ability to keep a steady beat as foundational to the development of rhythmic competency, and consequently, her approach to movement education is heavily focused on beat movement. She developed her *Rhythmic Competency Analysis Test (RCAT)* (Weikart, 1982) to measure the ability of children or adults to synchronize bodily

movements to beat. The test asks participants to pat the beat with both hands on the head, pat the beat on two alternating levels (head, shoulders), and walk to the beat. All of these tasks are synchronized with an external music source. Weikart found that first graders who experienced seven months of music classes emphasizing bodily movement to beat made improvements in their *RCAT* scores. These children scored much higher than children of the same age who did not receive movement instruction. The children in the experimental group experienced a teaching progression designed to lead them to rhythmic competency through a sequential series of beat experiences. Each level of experience required greater coordination as students engaged in more difficult beat keeping tasks. Weikart concluded that rhythmic competency in children is not solely gained through maturation but is directly effected by instruction and musical experiences.

Burnett (1983) found similar results in a study involving handicapped preschool children. Children who experienced rhythmic instruction during a 12-week period scored significantly higher on a post-test administration of *RCAT* (Weikart, 1982) than similar children who received no instruction. Instruction was based on movement to the pulse of rhythmic speech, songs, instrumental music and recordings. Although Burnett's small sample size of 23 and her specialized population makes generalization difficult, her study does support the view that rhythmic growth can be effected by musical experiences.

The purpose of a study by High (1987) was to examine the effects of two different approaches to rhythm instruction on the beat synchronization skills of kindergarten children. High compared a teaching approach based on Weikart's model with an approach that was labeled "traditional." The experimental group (n=50) was taught a curriculum based on kinesthetic movement to beat for 30 minutes once a week for 14

weeks. Children experienced keeping time with various body movements to a variety of musical stimuli. Only beat movements were stressed. The traditional approach (n=50) featured body movement to rhythmic phrase patterns. For example, students were instructed to clap along with the melodic rhythm of a song. A comparison of pre- and post-test scores on the *RCAT* (Weikart, 1982) led High to determine that instruction in kinesthetic movement to beat led to significant growth in steady beat competency. Since the gains in beat-keeping skill were significantly greater for the experimental group than the group experiencing the traditional rhythmic instruction, and both groups began at equal levels, High was able to conclude that gains in skill were influenced by instruction and not by maturation alone.

In their study of the beat synchronization ability of 98 children ages two to five years, Jersild and Bienstock (1935) found that a child's ability to perform in time by patting the hands or stepping to the beat of music played on a mechanical piano increased steadily with the age of the participant. A smaller treatment group (n=14) was given opportunities to practice beat-keeping tasks for 23 to 33 ten-minute periods over a ten-week period. Although the group did show slightly improved rhythmic skills at the end to this practice period, the change in their ability to synchronize to beat was not statistically significant. The researchers also found no significant difference between the performances of the treatment group and those of a control group (n=9) who received no instruction or practice. Jersild and Bienstock tentatively concluded that beat-keeping skill is most affected by maturational factors and is unlikely to be improved by the type of direct instruction or practice used in their study. The small treatment group employed by Jersild and Bienstock makes generalization of their conclusions problematic.

Additionally, as acknowledged by the researchers, the type of instruction given to the treatment group was quite limited and rigid, consisting of patting the beat and stepping to the beat in time to the same four musical selections, and instruction was given within a limited time frame.

Groves (1969) researched the effect of motor-rhythmic instruction on the rhythm synchronization ability of first, second, and third grade students. The treatment group (n=61) was given rhythmic instruction that included movement in response to rhythmic patterns for 24 weeks. Groves found no significant differences between the control group (n=70), which did not receive instruction, and the treatment group. He found that motor skills as measured by an adaptation of the *Brace Scale of Motor Ability* and age were the most significant influences on motor-rhythmic abilities and rhythmic synchronization skills.

Several problems with the Groves study are evident and render his results inconclusive. Groves' description of the nature of the instruction given to the treatment group is lacking in clarity and specifics. He states that students were instructed to move to various rhythmic patterns in response to music stimuli, but the nature of this movement is unspecified. His report seems to suggest that students were asked to move with rhythm pattern ostinati to music rather than maintain steady macrobeats or microbeats. Since the nature of Groves' treatment is so unclear, it is difficult to generalize his results or give credence to his conclusion that age and maturation are more influential than instruction on the rhythmic synchronization ability of children.

Rainbow (1981) compared the ability of preschool children aged three and four to successfully perform a variety of rhythmic tasks. These tasks included clapping, patting,

and walking to beat, vocally chanting rhythmic patterns with text, and clapping various rhythmic patterns. The students' rhythmic skills were rated several times during a three-year enrollment in a preschool program. The children experienced music instruction at for two or three fifteen-minute periods per week. Rainbow found that four-year-old students were significantly more successful with the majority of the rhythmic tasks than three-year-old students. He found no significant differences between four-year-old students following a full year of instruction and those who experienced only four months of instruction. Rainbow found that less than 50 percent of four-year-old children participating in his study were capable of maintaining a steady beat with bodily movement to a music stimulus. Rainbow concluded that physical maturation had a much greater impact on the rhythmic growth of preschool children than instruction. He also cautioned that the task of keeping a beat with bodily movement posed a difficult challenge for the majority of preschool children.

Rainbow does not provide much detail in his description of the curriculum employed in his study. He vaguely states that rhythmic activities were included as part of "a normal sequence of musical events" (Rainbow, 1981, p. 70). This makes it difficult to generalize his results and casts doubts on his conclusions. However, his findings do support Gordon's suggestion that steady beat instruction for many preschool children might be premature.

High and Burnett's research bolster Weikart's claim that beat competence can be positively effected by instruction. This conclusion conflicts with Jersild & Bienstock, Groves, and Rainbow who found no evidence to suggest that instruction has positive effect on rhythmic ability. Evidence does seem to show that instruction that stresses

rhythmic movement to beat can lead to increases in children's ability to perform this particular rhythmic skill. The Weikart, Burnett, and High studies did not specifically compare beat synchronization ability to music with a variety of tempi. The current study, compares two contrasting types of rhythmic instruction and their effects on beat competence in a variety of tempi and meters. The discovery of significant differences between the two treatments would lend support to the claim that beat competence can be effected by instruction. In the current study, Weikart's model of bodily movement exclusively to beat is compared to an approach in which continuous flowing movement precedes beat movement. Beat competence is measured in response to music of both slow and fast tempi in both duple and triple meters. The current study is also expanded to evaluate the ability of children to perform rhythmic chants with accuracy and consistent meter and tempo.

The Effect of Laban-based, Non-discrete Movement

Other researchers have examined the use of movement activities that are not beat related as a component of a music education curriculum. These researchers have examined whether such movement activities could encourage positive trends in music aptitude and/or achievement in music students.

Rohwer (1998) compared the beat competence of sixth grade beginning instrumentalist who were taught in a traditional manner with those whose instruction included movement activities. The treatment group experienced beat-focused movement as well as movement activities based on the Laban elements of weight, flow, time, and space. Following the treatment period, the three dependent variables of rhythm perception, synchronization, and performance were assessed by researcher designed

criterion measures. Rohwer found that the treatment group receiving movement instruction scored significantly higher on measures of rhythm synchronization and performance. She concluded that movement instruction could contribute to improvements in students' abilities to synchronize movement to a steady beat and to perform with consistent tempo.

Like the Rohwer study, the present study compares the effectiveness of two different instructional approaches. In the Rohwer study, the treatment group experienced both beat and non beat-focused movement activities. In the current study, one of the treatment groups also experienced both beat and non-beat movement activities with a focus on continuous flowing movement, while the second treatment group only experienced beat movement. Since the results of Rohwer's study support the conclusion that instruction incorporating movement is better than instruction with no movement, the present study seeks to clarify which type of movement activities might have a greater impact on children. Rohwer looked at sixth grade students with stabilized music aptitudes in a beginning instrumental setting. The present study is concerned with developmental music aptitude in a population of kindergarten students in a general music class setting. Since Rohwer found significant improvement in the achievement areas of beat synchronization and rhythm performance, the present study will uses criterion measures designed to assess these same aspects of music achievement.

Kim (2000) studied the effects of movement instruction on the singing skills and developmental tonal aptitudes of first grade students. Students were divided into two treatment groups and one control group. Treatment group A (n=27) experienced sequential movement instruction based on Laban effort elements in conjunction with

singing instruction. Treatment group B (n=26) received singing instruction without movement, while the control group (n=25) did not receive any music or movement instruction. At the conclusion of the ten week period, Kim rated each child's solo singing of a criterion song and administered the tonal sub-test of *PMMA* (Gordon, 1986a). After this short treatment period, no significant differences were found between the three groups, although the trends in the results seemed to favor movement instruction over no movement instruction, and both types of instruction over no instruction.

Like Kim's study, the current study seeks to examine the effects of non-discrete movement instruction on the aptitude and achievement of children. Rather than comparing two different types of movement instruction, Kim compared movement instruction to no movement instruction. Also, in contrast with the current study, Kim was interested in the effects of movement instruction on the development of tonal understanding and skills. Since Kim concluded that ten weeks was an inadequate treatment period for significant results to emerge, the current research engages participants in 23 weeks of instruction.

Jordan (1985) examined the effects of informal music instruction based on the movement philosophy of Laban on the rhythm achievement of high school students. Three treatment groups were all given movement instruction based on different combinations of Laban's effort elements. The first group experienced activities based on weight and flow; the second group experienced activities based on the elements of time and space, while the third group experienced activities the focused on various combinations of the four effort elements. Following the eleven week treatment period, Jordan administered his *Rhythm Discrimination Criterion Measure* and his *Rhythm*

Performance Criterion Measure (Jordan, 1985) to all students in order to determine the comparative effects of movement activities using different combinations of Laban effort elements on the rhythmic discrimination and performance skills of students. Jordan found that students who received informal movement instruction using all four combined effort elements of weight, flow, time, and space demonstrated superior rhythm performance skills to students who only received instruction in weight and flow combined or time and space combined.

The Jordan study supports the hypothesis that informal movement instruction, specifically non beat-related movement, can improve the rhythm achievement of students. There are important differences between the Jordan study and this study. Jordan worked with high school students with stabilized aptitudes, whereas this study examines kindergarten students with developmental aptitudes. Jordan compared the effects of different types of Laban movement activities, while the present study focuses it's comparisons on movement based on the Laban effort element of flow versus movement to beat. In addition, Jordan only examined the effect of movement on rhythm achievement, whereas the present study examines the effect of movement on rhythm achievement as well as developmental rhythm aptitude.

The purpose of Chernohorsky's study (1991) was to compare the effects of Laban-based movement activities on the rhythm performance abilities and developmental rhythm aptitude of students in second grade and students in kindergarten. Students in both grades were given movement experiences based on the Laban effort elements of weight, flow, time, and space as well as activities that focused on general body awareness. The treatment period was twenty-three weeks and was preceded and followed

by the administration of the *PMMA* (Gordon, 1986). In order to measure the rhythmic achievement of the children, three criterion chants were taught, and solo performances of the chants were rated on a continuous ratings scale by a panel of judges. Although Chernohorsky was unable to support the hypothesis that movement instruction would have a greater effect on the rhythm performance achievement of kindergarten students than on that of second graders, she did conclude that Laban-based movement instruction had a significant effect on the developmental rhythm aptitude of students with low aptitude.

Chernohorsky examined the interactions between grade level and aptitude level on the rhythm achievement and developmental aptitude of children who were exposed to a single type of movement instruction. In contrast, the current research compares two types of movement instruction. Similar criterion measures, *PMMA* and a rhythm performance ratings scale, are used in both studies. However, the current study also contains a beat synchronization criterion measure. The Chernohorsky study compared second grade and kindergarten students, while in this study, only kindergarten students are examined.

The Blesedell study (1991) is most similar to the present study. Blesedell compared the effects of two different types of movement instruction on the rhythm achievement, movement abilities, and aptitude of three- and four-year-old students enrolled in an early childhood music program. One treatment group received Laban-based movement instruction focusing on the effort elements of weight, flow, time, and space, while the second treatment group received movement instruction based on Dalcroze Eurythmics. The Laban instruction was based on a researcher-written story,

with movement activities reflecting various elements of the story. The Dalcroze groups also experienced the effort elements of weight, flow, time, and space. Eurythmics activities also included various beat-related movements and activities that encouraged movement responses to various musical concepts including changing tempi, changing dynamics, meter, and accent. The Dalcroze instruction stressed large muscle responses. Criterion measures employed by Blesedell included pre- and post-test administrations of *Audie* (Gordon, 1989), a music aptitude test designed for preschool children, a movement ability rating scale, and a rhythm synchronization ability rating scale. Blesedell did not discover any significant achievement or aptitude differences between the two treatment groups. She did find that both types of movement instruction contributed to significant increases in aptitude scores. Blesedell concluded that both Dalcroze and Laban movement instruction are beneficial for three- and four-year-old children.

Like Blesedell, this researcher began with the assumption that movement instruction is better than no movement instruction in the rhythmic education of children. The problems of the current study focus on determining what specific approach to movement instruction might be more beneficial. In the Blesedell study, both treatment groups experienced non beat-focused movement activities. The Dalcroze group also received beat-focused instruction. In the current study, the treatments consist of (a) beat only movement activities and (b) both beat-focused and continuous flowing movement activities. The current study also shares similar criterion measures with the Blesedell study, employing *PMMA* (Gordon, 1986), a music aptitude test that is similar to *Audie* but is more appropriate for kindergarten-age children. Similar to the Blesedell study, the

current study employs a beat synchronization ratings scale, although its scope is expanded to include a rhythm chant performance rating scale.

Summary

The research reviewed in this chapter represents three streams of inquiry: (a) the effect of instruction on developmental music aptitude, (b) the effect of movement instruction on the development of rhythmic skills, especially beat synchronization ability, and, more specifically, (c) the effect of non-discrete movement on musical skills and/or aptitude. Based on this review the current research begins with the following assumptions: (a) the music aptitude of kindergarten students is developmental and can be effected by instruction, (b) instruction that includes movement can positively effect rhythmic skill, especially beat competence, and (c) research is needed to determine whether non-discrete movement, especially based on the Laban effort element of flow can contribute to gains in music aptitude and achievement.

CHAPTER THREE

STUDY DESIGN

This study is a two-treatment group design with the two treatments being (a) instruction with movement activities exclusively to beat and (b) instruction with both movement activities to beat and movement activities with non-discrete, continuous-flowing movement.

Subjects

The participants in the study were kindergarten students attending a public elementary school in a small town in coastal Maine. The participants were almost exclusively Caucasian and represented diverse socio-economic levels. Approximately 30% of the school population is eligible for free or reduced lunch under the federal Title 1 program, although the percentage of kindergarten students who participate in this program was not determined by the researcher. A total of 50 students were included in the study, and they were divided among four intact kindergarten classes. Twenty-nine participants were male and 21 were female. The town in which the study took place is located in close proximity to a United States Navy air base, and approximately 20% of the school population are members of Navy families. This factor contributes to a transient school population. Eight students who began the study relocated before post-test measurements were taken, and eight students joined the kindergarten during the course of the treatment period. Data was not collected from these students for inclusion in the study

analysis. The same classroom teacher taught two of the classes, with one in the morning and one in the afternoon. The remaining two classes were taught by different teachers, also with one in the morning and one in the afternoon. All of the students also participated in a Kinderstart program that was taught by a non-certified educational technician, resulting in essentially a full-day kindergarten. All kindergarten students attended music class for one half-hour period weekly. Music class was taught in a separate music room, and all classes were taught by the researcher.

Procedure

Before the beginning of the school year, the study proposal was submitted for approval to the University Committee on Research Involving Human Subjects (UCRIHS). The administration of the school in which the study was to be conducted was also apprised of the details of the study. Approval was granted by both UCRIHS and the school, paving the way for the study to proceed. A consent form (Appendix A) was sent home with all of the kindergarten students informing parents of the research and the fact that participation was voluntary. Signed consent forms were returned to the researcher, and only those children for whom consent was given participated in the data-collection for the study.

During the third week of the school year, after two music class sessions, the rhythm sub-test of *Primary Measures of Music Audiation (PMMA)* (Gordon, 1986a) was administered to all children. All students experienced the same lesson plans during the first two class meetings, which were designed to introduce the children to their new music teacher and teach classroom procedures and expectations. There were no significant differences between the aptitude levels of the four kindergarten sections prior

to treatment. The classes were assigned to one of two treatments: beat only and flow and beat combined. Since one classroom teacher taught two of the classes, to minimize any teacher effect, one of her classes was assigned to the beat group and other was assigned to the flow and beat group. Since this first flow and beat group was a morning kindergarten class, an afternoon class was designated as the second flow and beat group. The second beat only group was a morning kindergarten class resulting in one morning and one afternoon class for each treatment.

In the beat-only treatment group (n= 23), the children experienced and participated in a variety of activities that featured movement to beat. The instructor modeled movement to the beat as the class performed songs and chants and listened to recorded music. The songs and chants included in the curriculum represented a variety of meters, but focused on duple and triple. The songs presented a variety of tonalities, with major and harmonic minor being the most prevalent. Rhythmic movements included patting with both hands on the knees, head, and shoulders, both bilaterally and alternating. Students also engaged in locomotor movement activities, including walking, tiptoeing, and stomping to music, as well as traditional children's singing games. Rhythm instruction was enhanced by the use of various instructional materials including beanbags, egg-shaped shakers, rhythm sticks, and pitched and non-pitched percussion instruments. During all movement activities, beat synchronization was modeled and encouraged by the instructor. Another element of the music class curriculum was tonal and rhythm pattern instruction. Students learned a vocabulary of two, three, or four pitch tonal patterns in major and harmonic minor tonalities, as well as two measure rhythm

patterns in duple and triple meters. Students were taught this pattern vocabulary through group and solo call-and-response experiences.

The flow and beat treatment group (n=27) experienced the same songs, chants, and musical games as the beat-only group. This treatment group was also presented the same vocabulary of tonal and rhythm patterns. Effort was made to ensure that the only treatment variable was the inclusion of non-discrete, continuous flowing movement. In contrast with the beat-only group, the flow and beat combined treatment group experienced flowing movements as modeled by the instructor. These movements included smooth waving of the arms, torso, and whole body. Students were also encouraged to move with continuous flow through imagery such as, "Soar like an eagle," "Sway in the breeze," "Stir the soup," or "Swim through the water." Flowing movements were performed with songs, chants, and recorded music by the instructor as well as the students. For the first ten weeks of instruction, exclusively flowing-type movements were included in the class sessions. Starting with the eleventh week, pulsing and beat movements were included alongside continuous flowing movement. Pulsing movements are a combination of continuous flow with the arms and/or body with simultaneous bouncing of the hands to the rhythmic pulse. This type of movement, similar to the arm motions of a conductor, was included based on the recommendations of Gordon (1997b) and Reynolds, et. al. (1998), who suggest that early experiences of beat should merge with rather than supplant the feeling of continuous movement and flow. For the remainder of the treatment period, students in the beat and flow group received instruction featuring a combination of flowing, pulsing, and beat movements. Similar instructional materials, including beanbags, egg shakers, and percussion instruments were

used in both treatment groups, with the addition of colorful nylon scarves to enhance the flowing movements of this second group.

The treatment period consisted of one half-hour class session each week for 23 weeks of the school calendar. This treatment was preceded by one week of *PMMA* testing and followed by three weeks of post-treatment data collection. During the last five weeks of instruction, two four-measure criterion chants representing duple and triple meters were taught to all participants. These chants were performed with the neutral syllable "bah."

Criterion Measures

In order to address the problems of the study, three criterion measures were employed at the conclusion of the treatment period. *PMMA* was re-administered to all children and beat synchronization and rhythm chant performance rating scales were used to rate participants performances of these rhythmic tasks.

Gordon's *Primary Measures of Music Audiation (PMMA)* (1986a) was used to measure any fluctuations in the developmental rhythm aptitude of the research participants. Gordon designed *PMMA* as a measurement of the audiation potential of children younger than age nine: children for whom music aptitude has not yet stabilized. The test is divided into two sub-tests measuring rhythm and tonal aptitude respectively. For the current study, only the rhythm sub-test was administered. The rhythm sub-test of *PMMA* consists of 40 test items recorded on a compact disk. Each test item consists of two short rhythm patterns played on a Moog music synthesizer. Children are asked to determine whether the two patterns sound the same or different, and they are instructed to mark their choice on the answer sheet. Since the target age group for this test often lacks

reading or number comprehension skills, the answer sheet is pictorial. Children circle pictures of faces that are the same if the patterns sound the same or pictures that are different if the patterns sound different.

According to Gordon (1986a), the test measures the ability of children to "derive immediate impressions and make intuitive responses in audiation" (p. 8). Since not enough time is allowed between the two patterns to allow memorization of the first pattern, successful determination of same and different does not depend on short-term memory. Since "it is impossible to teach another or oneself to derive immediate impressions and make intuitive responses in audiation," (p. 8) the ability of children to discriminate between test patterns indicates their innate level of audiation potential and reflects the quality of early musical experiences (Gordon, 1986a). During the fluid period in which a child's aptitude is developmental, "fluctuations result from the continuous interaction between a child's innate capacities and his environment" (p. 9). Since *PMMA* is sensitive to changes in children's audiation potential, it is an appropriate measure of the effects of different musical environments.

The second research problem of the study concerns the ability of children to synchronize their movements to an external beat source. Students were instructed to pat the "steady beat" on their laps with both hands as they listened to recorded music. The instructor modeled the correct movement for a few measures and then encouraged the students to continue after the modeling stopped. Instrumental music from the Rhythmically Moving (Weikart, 1999) series of folk music recordings provided the external beat source, and the musical selections represented the following meters and tempi: triple meter, fast tempo (macrobeat= mm.100); duple meter, fast tempo

(macrobeat=mm.100); triple meter, slow tempo (macrobeat=mm.48); and duple meter, slow tempo (macrobeat=mm.50). The variety of meters and tempi were included to provide a holistic and broad picture of the students' beat synchronization skill. Additionally, inclusion of both slow and fast tempi was influenced by Walters (1983), who found that beat synchronization to different tempi posed varying degrees of difficulty for a child depending on whether the external beat corresponded to his or her internal, personal tempo. For most children, beat synchronization to slow tempi poses a greater challenge. Students were videotaped in groups of three or four as they performed the beat-patting task. A panel of two independent judges rated the students' performances using a five-point continuous rating scale. The judges were graduate students in music education with extensive music teaching experience. The rating scale is shown in Appendix B. Since the research question was concerned with a holistic and broad view of beat synchronization skill, only the composite ratings of the judges on all of the musical selections was included in the data analysis.

The final criterion measure corresponds with the third research question, comparing the rhythm chant performance skills of the two treatment groups. Each child was audiotaped as they performed two previously learned criterion chants, one in duple and one in triple meter. Due to scheduling and time constraints, the recording took place in the context of a regular music class session, and all class members were present during the taping. After the tempo and meter were established through group chanting and beat patting, the researcher recorded each participant in turn as they were seated in a circle. The instructor prompted each child to begin his or her performance by saying, "Ready, go" in tempo. Two independent judges rated each child's ability to perform the chant

with accurate durations while maintaining a consistent tempo and meter using a five-point continuous rating scale. The rhythm chant performance ratings scale is included in Appendix C.

CHAPTER IV

RESULTS

The purpose of this research was to compare the effects of movement instruction that includes continuous flowing movement and beat movement with the effects of movement instruction that only focuses on beat on the developmental rhythm aptitude and rhythm achievement of kindergarten students. The specific areas of rhythmic achievement explored were the ability to synchronize movement to the beat of an external music source and the ability to perform rhythmic chants with accurate durations, and consistent meter and tempo.

Data was collected and analyzed using the following statistics: a) means and standard deviations of the pre-test scores on the rhythm sub-test of the *Primary Measures of Music Audiation (PMMA),* b) t-test to look for significant differences between the pre-test *PMMA* scores of the two treatment groups, c) corrected split-halves reliabilities for the *PMMA* pre- and post tests, d) interjudge reliabilities for the beat synchronization rating scale and the rhythm chant performance rating scale, e) means and standard deviations of the post-test and gain scores on the rhythm sub-test of *PMMA* for the two treatment groups, f) means and standard deviations of the raw scores for the two rating scales for both treatment groups, and g) t-tests to look for significant differences between the two treatment groups' rhythm aptitude gain scores, beat synchronization rating scores, and rhythm chant performance rating scores.

PMMA Pre-test Results

The rhythm sub-test of *PMMA* was administered to all participants before treatment began. The *PMMA* pre-test scores were analyzed to determine whether the developmental rhythm aptitude levels for each treatment group were comparable. Means and standard deviations for each treatment group are shown in Table 2. For the beat-only treatment group, the mean of the *PMMA* rhythm pre-test scores was 19.50, and the standard deviation was 3.71. For the flow and beat group, the mean of the *PMMA* rhythm pre-test score was 21.50, and the standard deviation was 5.03. The results of a two-tailed t-test (Table 3) showed that there were no significant rhythm aptitude differences between the two treatment groups.

Table 2

	PMMA Pre-test	
	Mean	Standard Deviation
Beat Only (n=20)	19.5	3.71
Flow and Beat (n=24)	21.5	5.03

Table 3

	Mean Difference	DF	t-value	p-value
PMMA Pre-test	2.0	42	1.474	.148

($p>.05$)

PMMA Reliability Results

PMMA pre- and post-test corrected split-halves reliabilities were calculated and then corrected using the Spearman-Brown Prophecy Formula. Pre-test reliability was

found to be .78. Post-test reliability was found to be .69. These are satisfactory reliabilities, although marginally so for the post-test.

Interjudge Reliability Results

Interjudge reliabilities between the two independent judges were determined for both the beat synchronization and rhythmic chant performance rating scales using the Pearson correlation. For the beat synchronization rating scale, the reliability of the composite ratings for students' synchronization to the beat in triple meter, fast tempo; duple meter, fast tempo; duple meter, slow tempo; and triple meter, slow tempo was .78. On the rhythm chant performance rating scale the reliability of the composite ratings for duple and triple meter chant performances was found to be .91. This represents an acceptable level of interjudge agreement. The two judges scores were combined for the following statistical analysis.

Means and Standard Deviations

Table 4 shows the mean scores and standard deviations for the two treatment groups for the PMMA post-test and gain scores. For the beat-only treatment group, the mean of the *PMMA* rhythm post-test scores was 24.55, and the standard deviation was 5.15. For the flow and beat group, the mean of the *PMMA* rhythm post-test scores was 24.54, and the standard deviation was 4.21. For the beat-only treatment group, the mean of the *PMMA* rhythm gains scores was 5.05, and the standard deviation was 5.53. For the flow and beat group, the mean of the *PMMA* rhythm gains score was 3.04, and the standard deviation was 4.41.

Table 4

	PMMA Post-test		PMMA Gains	
	Mean	Std Deviation	Mean	Std Deviation
Beat-Only, n=20	24.55	5.15	5.05	5.53
Flow and Beat, n=24	24.54	4.21	3.04	4.41

The trends in the data suggest that the beat-only treatment group tended to show greater gains in PMMA rhythm scores following the treatment period than did the flow and beat group.

Table 5 shows the mean scores and standard deviations for the two treatment groups on the beat synchronization and rhythm chant performance dimensions of the study. The beat-only treatments group's mean of the composite beat synchronization ratings was 27.04, and the standard deviation was 5.83. The flow and beat treatments group's mean composite of the beat synchronization ratings was 25.54 and the standard deviation was 8.0. The beat-only treatments group's mean of the composite rhythm chant ratings was 13.91 and the standard deviation was 3.15. The flow and beat treatments group's mean of the composite beat synchronization ratings was 11.87, and the standard deviation was 4.46.

Table 5

	Beat synchronization composite ratings		Rhythm chant composite ratings	
	Mean	Std. deviation	Mean	Std. deviation
Beat only, n=23	27.04	5.83	13.91	3.15
Flow and beat, n=24	25.54	8.0	11.87	4.46

For both the beat synchronization and rhythm chant criterion measures, the trend of the mean scores tended to favor the beat-only treatment group.

Results for *PMMA* Rhythm Scores

Two-tailed t-tests were used to determine if any significant differences existed between the *PMMA* gains scores of the two treatment groups. The results are reported in Table 6. Neither of the results are significantly different (p>.05). It cannot be determined from this data that either treatment method is more likely to influence kindergarten students to achieve greater gains in rhythmic aptitude as measured by *PMMA*.

Table 6

	Mean Difference	DF	t-value	p-value
PMMA Gains (p>.05)	-2.008	42	-1.341	.1872

Results for Beat Synchronization

A two-tailed t-test was used to determine if there were any significant differences between the two treatment groups on scores for the beat synchronization rating scale. The composite ratings beat synchronization were analyzed. The results are reported in Table 7. This result is not statistically significant (p>.05). It cannot be determined on the basis of this data that either treatment method will have a significantly greater effect on the beat synchronization ability of kindergarten students.

Table 7

Results of t-test on beat synchronization composite mean scores

Mean Difference	DF	t-value	p-value
-1.502	45	-.733	.467

(p>.05)

Results for Rhythm Chant Performance

A two-tailed t-test was also used to look for a significant difference between the mean scores of the two treatment groups on the rhythm chant performance rating scale. The composite ratings of chants were compared (Table 8). Again, the result was not statistically significant (p>.05). It cannot be determined on the basis of this data that either treatment method will have a significantly greater effect on the rhythm chant performance ability of kindergarten students.

Table 8

Results of t-test on rhythm chant composite mean scores

Mean Difference	DF	t-value	p-value
-2.043	44	-1.797	.079

(p>.05)

Interpretation of Results

The results reported above show no significant differences between the two treatment groups for any of the criterion measures employed in the study. One cannot conclude on the basis of these results that either of the two types of instruction, movement to beat or the combination of both flowing and beat movement, when employed during a 23 week period, has a greater effect on gains in developmental rhythm aptitude. This study also does not suggest that either instructional method is preferable for teaching beat synchronization skills or rhythm chant performance skills. However, an interpretation of these results should consider several factors that may have contributed to this outcome.

It is necessary to consider that the data collection methodology may have influenced the results that were obtained. This is especially true for the beat synchronization rating scale. Children were videotaped while patting the beat to accompanying recordings in groups of three or four. This methodology may have affected results, since individuals may have been unduly influenced by the skill level of other children seated in close proximity. For example, a child who vigorously patted the incorrect beat might have thrown off other children who would have received higher ratings if they were performing in isolation. Additionally, during the videotaping, other children were in the room awaiting their turn to perform. These off-camera children may have been a distraction to the children performing the criterion task. Time and scheduling pressures that are difficult to avoid in a public school setting necessitated this less-than-optimum data gathering procedure. This method of collecting data is probably reflected in the moderate interjudge reliability of .78. Also, the judges may have had difficulty

focusing on individual children and objectively noting the degree of beat synchronization with several children appearing on the screen.

Also worth consideration is the possibility that the criterion chants used in the rhythm chant performance criterion measure were too short to provide an accurate measure of performance skill. Since comparing the ability to sustain a consistent tempo and meter throughout a performance was a primary objective of this measure, perhaps a longer chant length would have led to greater ease and accuracy in rating. However, the high degree of interjudge reliability does suggest that the chant length was of adequate length for fair conclusions to be drawn. The data collection procedure for this criterion measure also may have influenced the results. Since the participants were recorded in a group setting, they may have been distracted by classmates, or they may have suffered nervousness about performing in front of peers. Also, the errors of some children may have been absorbed and repeated by subsequent performers.

The recorded music that was used for the beat synchronization criterion measure was unfamiliar to the students. Also, the task of synchronizing to recorded instrumental music was less familiar to the students than keeping the beat to songs and chants performed by the teacher. Students did experience beat synchronization activities using recordings, but with much less frequency. Perhaps the relative novelty of the task resulted in lower ratings that failed to accurately reflect children's true beat competence levels.

Another important factor to consider in the interpretation of results is the make-up of the two treatment groups. With research using intact classes in a real-world school setting, it is difficult to control the variables between groups and ensure that the measurements obtained reflect only differences based on treatments. In the current

research, differences in student behavior may have influenced the data. One of the classes who received instruction in both flowing and beat movement posed difficult classroom management challenges for the instructor. Due to these behavior issues, the children in this class received less direct music instruction than the other classes, since considerable time and effort was spent on re-direction and correction of classroom behavior.

There also may have been important differences in the amount and quality of music instruction given by the classroom teachers throughout the school day in addition to the instruction received in music class.

Since the researcher taught all classes, it is possible that flowing movements were inadvertently incorporated into the instruction of the beat-only treatment group. For example, while patting the beat to a song, subtle head and torso swaying might have been modeled by the instructor.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Music educators have strongly advocated movement as an important component of general music curricula. Movement has been seen as especially useful for the cultivation of rhythmic ability. Research findings have tended to support these assertions. A review of the research literature suggests that more research is needed to clarify which types of movement instruction might be most beneficial in encouraging rhythmic growth in young children.

The purpose of this research was to compare the effects of movement instruction that included continuous flowing movement and beat movement with the effects of movement instruction that only focused on beat on the developmental aptitude and rhythmic achievement of children. The study focused on three specific research problems. First, would there be any significant difference in the developmental rhythm aptitude gain scores of kindergarten students who experienced only movement to beat with those who experienced both continuous, flowing movement in addition to movement to beat. Second, would there be any significant differences between children in the two treatment groups in the ability to synchronize body movement to an external musical beat. Finally, would there be any significant differences between children in the two treatment groups in their abilities to perform a rhythm chant with accuracy and consistent meter and tempo.

The current study represents a two-treatment group design. Forty-seven kindergarten children from a public elementary school in a small Maine town participated in the study. Four intact kindergarten classes were divided into two treatment groups, the beat only group and the combined flow and beat group. The researcher taught all classes for one half-hour each week for a total of 23 weeks. Before treatment began, the rhythm sub-test of the *Primary Measures of Music Audiation (PMMA)* (Gordon, 1986a) was administered to all participants.

For the beat-only treatment group, the instructor modeled a variety of movements that synchronized with the beat of songs, chants, and recorded music. A large percentage of the class time included movement to beat. Students also performed to beat on various percussion instruments and experienced a vocabulary of rhythm patterns that were chanted in call-and-response style.

For the combined beat and flow group, the instructor began the treatment period by exclusively modeling smoothly flowing, non-discrete movements. Children were instructed to sway their arms, torsos, and whole bodies in a fluid, continuous manner in accompaniment to songs, chants, and recorded music. After ten weeks of instruction in exclusively flowing movement, the instructor began to include pulsing movements in which flow and beat movements were combined, as well as more traditional beat-keeping activities. For the final 13 weeks of instruction, both flowing and beat keeping movement activities were experienced by the children in this treatment group. Students in this treatment group also experienced the same rhythm pattern vocabulary as the beat only group and, during the final 13 weeks of treatment, were given similar instrument playing experiences.

Following the treatment period, three criterion measures were used to compare the effects of the two treatments. The rhythmic subtest of PMMA was re-administered to measure developmental rhythmic aptitude gains. Participants were videotaped as they patted their laps along with the beat of folk music recordings representing duple meter in fast and slow tempi and triple meter in fast and slow tempi. A five-point, continuous beat-synchronization rating scale was used by a panel of two judges to rate the videotaped performances of the participants. Finally, participants were tape-recorded as they performed two rhythmic chants on a neutral syllable, one in duple meter and the other in triple meter. A five-point, continuous rhythm chant performance rating scale was used by a panel of two judges to rate the taped chant performances. Both the beat synchronization rating scale and the rhythm chant performance rating scale were designed by the researcher for this study.

The judges' ratings on these post-test measures were analyzed for inter-judge reliability. Means and standard deviations were calculated for the pre- and post-test *PMMA* scores as well as the *PMMA* gains scores. Means and standard deviations were also calculated for the beat synchronization ratings and the rhythm chant performance ratings. T-tests were used to analyze the data to determine if significant differences were found between the treatment groups for the three criterion measures.

Results

No significant differences were found between the two treatment groups on any of the criterion measures. It cannot be determined based on the results of this study that either type of movement instruction is more effective in encouraging growth in rhythmic aptitude. It also cannot be determined based on the results of this study that either

treatment will lead kindergarten classes to achieve greater beat synchronization competence or rhythm chant performance skill.

Conclusions

No significant differences were found between the two treatment groups for any of the problems of the study. One cannot conclude from the results of this study that either treatment will result in larger gains in developmental rhythm aptitude. The results of the study may tend to confirm the concept of developmental music aptitude, since both treatment groups showed positive gains in *PMMA* test scores, although these gains may be due to the maturation of the participants.

One also cannot conclude from the results of this study that either type of movement instruction will result in greater beat synchronization ability. It should be noted that although the members of the beat-only group had substantially more practice with movement to beat than the combined flow and beat group, their ratings were not significantly higher on the beat-synchronization measurement. This suggests that the inclusion of flowing movement in the music curriculum, with a corresponding decrease in the frequency of beat-keeping activities, does not significantly hinder the development of beat synchronization skill. Since the possible benefits of flowing movement, which might be discovered with further research, does not appear to come at the cost of delayed beat competency, teachers should consider including both types of movement in their kindergarten music classes until such research is undertaken.

Finally, one cannot conclude from the results of this research that either type of movement instruction will have a greater effect on the ability of kindergarten students to perform rhythm chants with accuracy and consistent meter and tempo.

Recommendations for Future Research

Due to the limitations of this study and the lack of significant results, it is clear that further research in this area is needed. The recognition of this need leads to the following recommendations:

This study should be repeated with a larger population of students. This would better control for the inevitable variations between groups that were encountered in the present study. The combination of small sample size and variations in student behavior may have influenced the results of the current study.

This study should be repeated with a more reliable beat synchronization measurement instrument. Videotaping students individually and using a more familiar beat synchronization task might lead to more accurate and reliable measurements of beat-keeping skill.

Future studies comparing students who experience flowing movement with those who were only instructed to move to beat should be carried out for a longer period of time. Perhaps differences in aptitude and rhythmic achievement may appear after an extended treatment period. It would be especially valuable to undertake a longitudinal study exploring the rhythmic ability of older elementary school children whose first movement experiences in preschool or kindergarten consisted of continuous flowing movement.

After experiencing the responses of kindergarten children to these two contrasting approaches to rhythmic movement, the researcher is led to question whether the specific criterion measures employed in this study adequately address the true value of flowing

movement instruction. Perhaps other aspects of musicianship besides beat synchronization or chant accuracy are positively effected by flowing movement instruction. Further research should examine other facets of musical skill, especially in the areas of expressiveness and phrasing. Flowing movement instruction may be a valuable companion to beat movement instruction in encouraging the holistic musical development of children.

Similar research should be undertaken with younger students. Flowing movement might be especially valuable for younger children who are less able to coordinate their movements to beat. Flowing movement in the preschool years might provide a valuable foundation for the commencement of beat instruction beginning in kindergarten.

The non-significant results obtained by this research might be interpreted to support the view that improved beat synchronization ability is more a product of maturation than a result of instruction. Further research is needed to separate the effects of age, physical coordination, and type of instruction on beat synchronization ability.

APPENDIX A

CONSENT LETTER

Woodside Elementary School
42 Barrows Drive
Topsham, ME 04086

9/15/2002

Dear Kindergarten Parent or Caregiver,

We are beginning an exciting new year in the music department at Woodside School, and I am delighted to have the opportunity to share music with your kindergarten student. I am writing to inform you about a research study that I will be undertaking in connection with my Masters degree thesis, and, more importantly, to enhance my understanding of children's musical learning. The focus of the study will be on kinesthetic movement experiences and their effect on the rhythmic growth of children. All children will participate in rhythmic movement activities throughout the year, some focusing on relaxed, flowing movement, and others focused on movement to steady beat. Student achievement in rhythmic tasks will be measured in the spring, and rhythmic music aptitude will be assessed both before and after the study. Student performances of rhythm activities will be videotaped to aid in the collection of information, and two qualified music educators in addition to me will view the videotapes. All information gathered for this study will be kept confidential, and all results will be published anonymously. All instructional activities and assessments used in this project correspond with Maine Learning Results standards. Your child's participation in this project is completely voluntary. If you do not wish to have your child included in the study, he or she will still participate in all activities and aptitude assessments, since these are part of the kindergarten music curriculum at Woodside School. Non-participating children will simply not be videotaped, and their scores on assessment tests will not be included in the study analysis. Children who are not videotaped will be given an alternative music activity to experience on the day that videotaping takes place. If you have any questions or concerns about this study, please feel free to contact me at Woodside, or, alternatively, questions can be directed to my advisor at Michigan State University. I hope that you will all lend your support to this project by returning the attached consent form.

Thank you,

David Olsen Pietrowski
Music Teacher

cc: Sandra Trach, Principal
Jennifer Cotreau, Assistant Principal

If you have any questions about this study please contact Mr. Olsen Pietrowski at 798-4719 or e-mail at pietrowskid@link75.org . If you have questions or concerns regarding your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact - anonymously, if you wish – Ashir Kumar, M.D., Chair of the University Committee on Research Involving Human Subjects (UCRIHS) by phone: (517) 355-2180, fax: (517) 432-4503, e-mail: ucrihs@msu.edu, or regular mail: 202 Olds Hall, East Lansing, MI 48824.

APPENDIX B

BEAT SYNCHRONIZATION RATING SCALE

5. Synchronizes beat with music for all or most of the time
4. Synchronizes beat with music for some of the time
3. Maintains a steady beat for all or most of the time, but not synchronized with music
2. Maintains a steady beat for some of the time, but not synchronized with music
1. Pats lap without a consistent or steady beat

APPENDIX C

RHYTHM CHANT RATING SCALE

5. Performs chant with correct meter, maintaining established tempo, with accurate durations
4. Performs chant with correct meter, maintaining established tempo, with some inaccurate durations
3. Performs chant with correct meter. Maintains a consistent beat that differs from the established tempo
2. Performs chant with correct meter. Beat does not remain consistent
1. Performs chant with incorrect or inconsistent meter

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