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THE EFFECT OF TONAL PATTERN INSTRUCTION ON THE SINGING VOICE DEVELOPMENT OF FIRST GRADE STUDENTS

By

Renee Michelle Vande Wege

A THESIS

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

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ABSTRACT

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By

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The purpose of this study was to determine whether pattern instruction, specifically those designed by Gordon in his Learning Sequence Activities (LSA), affects the development of singing voice in children. The specific problem of this study was to determine if first grade students who received tonal pattern instruction experienced greater gains in singing voice development than students who did not receive tonal pattern instruction. Subjects (n=63) came from four intact first grade classes from a semi-rural school district in Michigan. Two classes served as the experimental group, and two classes served as the control group. For 18 weeks, all students received instruction from a music specialist for two 42-minute sessions. The tonal aptitude of all students was determined prior to treatment, using Gordon's Primary Measures of Music Audiation (PMMA). All students were individually pre- and posttested with Rutkowski's Singing Voice Development Measure (SVDM). The experimental group received 11 weeks of pattern instruction for the first five or ten minutes of each music class. Two qualified, independent raters scored SVDM performances. Their interjudge reliabilities were high. A t-test was performed on gain scores to determine if pattern instruction had an effect on the singing voice development of first grade students. No significant difference was found according to treatment.

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CHAPTER ONE

LITERATURE REVIEW

Singing Voice

Throughout the last 50 years, researchers and music educators have studied the use and development of singing voice in children. This is not surprising, considering the quantity of class time music educators spend singing with their students. Unfortunately, this focus on singing voice also is a result of the large number of students who are labeled "non-singers" (Levinowitz et al., 1998). Researchers and teachers are trying to help students learn to use their voices so that they can express themselves vocally. Levinowitz, Barnes, Guerrini, Clement, D'April, & Morey (1998) discovered an alarming number of children who were considered non-singers: 75 to 90 percent of those participating in their study. Kinesthetic and psychological (acquisition and processing) development of the singing voice must no longer be ignored. This problem must be addressed in current music education practices.

Singing voice does not develop because of maturation alone. Successful singers in the primary grades often come from rich singing environments. However, unsuccessful singers who have not had the same rich backgrounds may have equal or greater singing potential but never have been taught *how* to sing during the primary grades or at home (Atterbury, 1984).

Singing in-tune and using a singing voice are separate constructs (Rutkowski, 1990, 1996; Rutkowski & Miller, 2003), and each must be understood in order to provide children with appropriate music instruction. Before a child can sing in-tune, he or she must be able to produce sounds other than those used for speaking. A child may sing a song out-of-tune, even to the point that the melody is unrecognizable, but be able to use a wide range of pitches (high and low) in a singing voice quality. Such a child would

be considered to have a well-developed singing voice, because he or she is using pitches that are outside the range of a speaking voice and is using a singing voice quality. Often, children with well-developed singing voices can match pitch, but accurately matching pitches is different from the focus of this study, which is the development of children's singing voices.

Although singing has often been characterized as an innate ability, current researchers and practitioners believe that it is a teachable skill (Apfelstadt, 1984; Goetze, Cooper, & Brown, 1990; Gordon, 1971; Gould, 1968; Jones, 1979; Roberts & Davies, 1975; Wolner & Pyle, 1933). Methods of remediation used by researchers in the past include daily, individual lessons in matching pitches (Wolner & Pyle, 1933); the speechto-song approach (Gould, 1968; Roberts & Davies, 1975); visual and verbal reinforcement with the aid of a vertical keyboard (Jones, 1979); and emphasis on musical concepts or visual and kinesthetic pitch reinforcement (Apfelstadt, 1984).

Several factors are involved when teaching children to use their singing voices. These factors include gender of the singer, type of vocal models used, style of accompaniment, age of the singer, song range, use of text versus neutral syllables, largegroup versus individual instruction, and instructional method. Understandably, researchers have studied these factors in a variety of ways, creating some inconsistencies among the results.

Apfelstadt (1984), Pederson & Pederson (1970), and Sinor (1985) found no significant differences in singing accuracy on the basis of gender. However, Jordan-DeCarbo (1982) found that girls sing more accurately than boys. Also, the gender and age of the vocal model used when preparing a child to sing results in differing levels of singing accuracy. Sims, Moore, & Kuhn (1982) were interested in the effects of female and male vocal stimuli, tonal pattern length, and age on vocal pitch-matching abilities of five- and



six-year-old children from England and the United States. They observed that it is difficult for children to replicate tones sung or played in a register other than their own and concluded that a female vocal model elicited more correct responses than a male model. Green (1990) built upon this discovery when studying subjects from grades one to six. She found that not only did the adult female model result in more correct responses than the adult male, but that subjects most accurately matched pitch after hearing a child's vocal model rather than that of an adult.

Researchers also have studied the use of accompaniment in relation to singing accuracy (Atterbury & Silcox, 1993; Guilbault, 2004; Stauffer, 1986). Recently, Guilbault (2004) studied the effect of chord root accompaniment on the tonal achievement and tonal improvisations of kindergarten and first grade students. Although root melody accompaniment did not significantly improve singing accuracy, the use of root melody accompaniments during instruction enhanced students' tonal strength during improvisation.

Atterbury & Silcox (1993) studied the effect of piano accompaniment on kindergartners' developmental singing ability. While no significant differences were found between students who received a year of singing instruction with piano accompaniment and students who received identical instruction without piano accompaniment, subjects with high music aptitude scored significantly higher on posttest song scores than those with low or average aptitude.

Stauffer (1986) studied the effects of melodic and harmonic contexts provided during melodic echo training on the development of singing skills and aural discrimination abilities in first, second, and third grade students. She concluded that aural discrimination of tonal patterns, vocal imitation of melodic patterns, and ability to sing rote songs are strongly related; aural discrimination and singing skills improve with training, regardless

of musical context; harmonic context used in music training tasks may be more beneficial to older children than younger children; girls tend to score higher on singing tasks than boys; and musical skills are affected by maturation with more rapid growth occurring in earlier grades.

Researchers tend to agree that singing accuracy improves with age or maturity (Geringer, 1983; Goetze, Cooper, & Brown, 1990; Roberts & Davies, 1975; Rutkowski & Miller, 2003), but they caution educators not to assume that improvement will occur without specific and attentive instruction. Vocal range also extends with age. Children's vocal ranges have been assessed by numerous researchers (Jones, 1979; Moore, 1991; Rutkowski & Runfola, 1997; Wassum, 1979). Wassum (1979) discovered no significant difference between genders prior to puberty, but the range she identified for all pre-voicechange singers was wider and higher than that identified by Jones (1979). Three registers have been identified (low, middle, and high), and children can be taught to use all three. Nevertheless, Rutkowski & Runfola (1997) cautioned against using songs that do not fall into the following ranges and tessituras for each prescribed grade level described below.

Grade	Range	Tessitura
K-1	D3 to B3	D3 to F#3
2-3	C3 to C4	D3 to A3
4-6	B2 to E4	D3 to A3

Figure 1 - Suggested Singing Ranges and Tessituras for Grades K-6

Moore (1991) studied the preferred vocal ranges and tessituras of musically talented children (ages eight to eleven) and adults (ages 20 to 40). He discovered that both groups had extremely similar range spans (about two octaves), and, if no initial pitch was provided, subjects sang in the lower half of their range. He suggested that music teachers encourage students to use their upper vocal range.

A number of researchers (Goetze, 1986; Levinowitz, 1989; Lange, 2000; Sims, Moore, & Kuhn, 1982) have questioned the use of text and its effect on children's vocal development, because a child's language development may affect his or her ability to learn a song with words. If text becomes the child's primary concern, he or she may not be able to focus on the musical elements of the song. In a study conducted by Sims, Moore, & Kuhn (1982), no difference in pitch accuracy was found when children sang using text versus neutral syllables. Goetze (1986), however, found that kindergarten, first, and third grade students sang significantly better and nearer to the modeled pitch when using the syllable "loo" than when singing with text.

Lange (2000) studied the effect of song instruction with and without text on the tonal aptitude, tonal accuracy, and tonal understanding of kindergarten students and discovered that students who received song instruction without text experienced greater gains in tonal aptitude than students who received only song instruction with text. However, after 24 weeks of instruction, she found no significant difference in the subjects' tonal accuracy as a result of treatment. Thus, Lange recommends that children receive song instruction with and without text.

Levinowitz (1989) conducted a study with kindergarten subjects in which half the songs were taught each week using text, and the other half were taught using a neutral syllable. Songs sung on a neutral syllable at the end of the study were performed more accurately than songs with text. She states that it is possible that two mental processes are involved when children learn a song with words, one for audiation and the other for vocabulary; thus, both play an important role in children's development.

Environment also may have an effect on singing accuracy. Thus, researchers recommend giving children ample opportunities to sing alone in a supportive

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environment (Goetze, 1989; Rutkowski, 1996). Goetze, Cooper, & Brown (1990) suggest that children may have difficulty listening to their own voice in the presence of louder singers, such as other children and/or the teacher.

After studying the effects of individual and small-group activities on kindergartners' use of singing voice and developmental aptitude, Rutkowski (1996) concluded that individual instruction, even within a large group setting, improves singing accuracy and achievement. Goetze (1989) found similar results with kindergarten, first, and third grade subjects. She suggested that accurate individual singing is a prerequisite to successful large-group singing, and that singing individually is easier for children than large-group singing. Furthermore, Goetze supported previous conclusions that singing accuracy increases with age, and that girls achieve singing accuracy earlier than boys. Hence, the presence of other voices has a greater affect on boys than on girls. In light of these findings, it seems reasonable that, if children only experience large-group singing, the development of their singing voices may suffer. In contrast, Cooper (1995) investigated singing accuracy as a function of individual versus unison singing for first through fifth grade students and found no significant difference in accuracy when children sang individually or in unison.

When studying children's ability to sing tonal patterns, recent researchers have found results that conflict with earlier studies in regard to the ease of singing large and small intervals (Drexler, 1938; Jarjisian, 1983; Jersild & Bienstock, 1931; Jones, 1979; Sinor, 1985). Intervals of a second or a third were formerly thought to be easiest to reproduce (Drexler, 1938; Jersild & Bienstock, 1931). Nonetheless, Jones (1979) concluded that, after the descending minor third, ascending perfect fourths and stepwise patterns based on "do-re-mi" were easiest for her second, third, and fourth grade subjects. Jones also determined that some subjects sang pitches accurately when they

were heard within patterns, but not when they were sounded as solitary tones or scales. Sinor (1985) determined that preschool children find half steps easier to sing than whole steps and thirds; thirds (particularly the descending minor third) easier to sing than sixths; and that descending patterns are possibly easier to sing than ascending patterns. Jarjisian (1983) found both diatonic and pentatonic patterns to be useful, because diatonic patterns assisted in developing the student's sense of tonal center, whereas the pentatonic patterns encourage a sense of melodic contour.

Pitch discrimination has been studied to help determine why these intervals are easier or more difficult to sing (Apfelstadt, 1984; Feierabend, 1984; Geringer, 1983; Goetze, Cooper, & Brown, 1990; Joyner, 1969; Zwissler, 1972). Goetze, Cooper, & Brown (1990) reported several causes for inaccurate singing: failure to notice pitch changes, psychological inhibition, inability to coordinate the vocal mechanism, low speaking voices, lack of interest in singing, lack of singing practice, and lack of exposure to music at home. Zwissler (1972) found pitch discrimination and vocal accuracy to be related abilities, but Geringer (1983) suggested that they are initially independent and that the relationship develops with training and maturity. Apfelstadt (1984) reported no significant correlation between kindergartners' pitch discrimination and vocal accuracy, whereas Feierabend (1984) found a significant relationship between the listening and singing skills of first graders. Joyner (1969), however, suggested that vocal instruction may produce more benefits than aural skill treatments for children who struggle with pitch discrimination and vocal accuracy. Goetze, Cooper, & Brown (1990) note that the inconsistencies in the above findings involve children who can accurately discriminate pitch but fail to reproduce the pitches vocally. It is possible that an inability to control the vocal mechanism is the reason for inaccurate singing, rather than an aural deficiency.

As a result of this body of research, much has been learned about the singing

voice. Singing is now recognized as a skill that can be taught, and, with proper instruction, singing accuracy will increase with age. Proper instruction requires that the teacher be aware of the difference between the development of a singing voice and pitch accuracy, as well as how gender differences, healthy vocal models, and vocal ranges affect singing accuracy. Current practitioners should also understand the importance of including song instruction with and without text, as well as opportunities for students to sing individually and in small groups without accompaniment or with root melody accompaniment in a classroom setting.

While researchers have provided insights into the factors that influence vocal accuracy, the problem of helping children learn to use their singing voices remains. The development of a child's singing voice must occur before he or she can be expected to match pitches accurately. In order to become singers, students must be taught to find and improve the use of their singing voices. How can this be done?

Tonal Pattern Instruction

Tonal pattern instruction has been an important part of most elementary general music curricula for a century. Kodaly, Orff, and Gordon all use patterns as a part of their instructional methodologies. Numerous researchers have studied the singing of tonal patterns with children.

Pattern length affects children's ability to reproduce a pattern and recognize it within a larger context (Foley, 1975; Sims, Moore, & Kuhn, 1982). When studying fiveand six-year-old children from England and the United States, Sims, Moore, & Kuhn (1982) concluded that shorter patterns, consisting of two or three pitches, are easier for children to replicate accurately. Foley (1975), however, studied the use of longer pitch patterns, consisting of five or six pitches, with second grade students for approximately

the same length of time and concluded that including 10 minutes of pattern instruction in each music class significantly increases conservation of both tonal and rhythmic patterns. Thus, after receiving pattern instruction, subjects were more able to identify patterns in unfamiliar music that reminded them of patterns they had previously heard. However, children's ability to sing these longer patterns was not measured.

Feierabend (1984) and Jordan-Decarbo (1982) studied the difference between aural recognition and singing ability. Jordan-Decarbo (1982) studied same/different discrimination techniques, readiness training, pattern treatment, and gender on aural discrimination and singing of tonal patterns by kindergartners. She discovered significant differences in regard to gender (girls scored higher than boys), but not in regard to technique and readiness. She concluded that tonal-pattern training does not affect aural perception ability and singing ability in the same way. This means that kindergarten students may be able to determine whether two patterns are the same or different, but not be able to reproduce them vocally.

Feierabend (1984) examined the relationship between singing ability and aural recognition of "sameness" and "difference." He was interested in the effects of training based on tonal patterns that are easy to sing and/or easy to aurally discriminate on first graders' development of singing and aural discrimination skills. Feierabend discovered that subjects were most successful at correctly audiating patterns containing or ending with tonic, while they were best at singing patterns containing small intervals. Based on gain scores, he concluded that although there is little relationship between singing and aural discrimination abilities, these abilities are more similar when patterns are easy to sing than when patterns are easy to aurally discriminate. When focusing on singing voice development, patterns that are easier to sing (e.g., small intervals, tonic patterns) should be presented prior to patterns that are more difficult to sing.

Pattern instruction in relation to tonality has been studied by Flowers & Dunne-Sousa (1990) and Jarjisian (1983). Flowers & Dunne-Sousa studied young children's abilities to echo short pitch patterns in relation to the maintenance of a tonal center in self-chosen and taught songs. They suggested that pattern and song performance are less related than previously thought, but it is possible that singing patterns may serve as readiness for singing songs.

Jarjisian (1983) studied the effects of pentatonic and diatonic instruction content, socioeconomic status, and music aptitude on the rote-singing achievement of first grade subjects. She discovered that subjects who received both diatonic and pentatonic pattern instruction scored significantly higher than those who received one or the other. Additionally, subjects with high aptitude sang significantly more accurately than those with low aptitude. Thus, the researcher concluded that using both pentatonic and diatonic patterns provide students with the richest atmosphere for musical growth.

Gordon (1990) designed his *Music Learning Theory* (MLT) based on the belief that children's music achievement increases as they acquire a vocabulary of tonal and rhythm patterns. An outgrowth of this theory is a basal series known as *Jump Right In: The Music Curriculum*. It includes activities and techniques based on a sequential approach to teaching musical skills and content in the general music classroom (Taggart, Bolton, Reynolds, Valerio & Gordon, 2000). *Learning Sequence Activities* (LSA) comprise an important part of a MLT-based curriculum and involve building students' music vocabularies through singing and chanting specific patterns in a variety of tonalities and meters. Classroom activities comprise another portion of a MLT-based curriculum and involve the use of conventional music literature for singing, playing instruments and moving. LSA are pattern instruction that provide students with a foundation of tonal, rhythmic, and audiation skills, while classroom activities provide opportunities for

students to develop and refine their audiation and performance skills with musicality and understanding.

Shuler (1987) examined the effects of Gordon's LSA on third grade students' music achievement. For the experimental groups, LSA comprised the first 25% of each class, followed by traditional classroom activities. The control groups received only traditional instruction. Two teachers were used for this experiment. The experimental group for Teacher One had a mean performance posttest score that was significantly higher than that of the control group. However, the mean performance posttest score of the experimental group taught by Teacher Two was significantly lower than the mean of the control group. Because of these conflicting results, Shuler determined that the effectiveness of LSA may heavily depend of how well the teacher incorporates LSA into instruction.

Yang (2002) studied the comparative effects of a curriculum based on MLT, which included pattern instruction, and the traditional Taiwanese National Curriculum on the developmental music aptitudes and singing performances of first grade students in Taiwan. He used four first grade classes (n=141) and randomly assigned two to the experimental group. These students received music instruction based on MLT. The other two classes served as the control group and received traditional Taiwanese music instruction. All classes met for one 40-minute session per week for 12 weeks. *Primary Measures of Music Audiation* (PMMA), a standardized instrument designed to measure developmental music aptitude, was given as a pre- and posttest, and students' singing performance for one criterion song was recorded at the end of 12 weeks. These performances were judged by three independent judges using a rating scale designed by the investigator.

Significant differences were found only in rhythmic aptitude, not in tonal aptitude

or singing performance. The students who received MLT scored significantly higher on the *Rhythm* subtest of PMMA than students who received traditional Taiwanese music instruction. Yang hypothesized that the singing performance test did not produce significant results for a number of reasons, including: the lack of experience students had singing alone, the large class sizes in which students received instruction, too short a treatment period (12 weeks), pre-existing differences between students, the use of only one criterion song, the absence of piano accompaniment, and the overall lack of difficulty the song contained. This culminated in a poor representation of student abilities. Students' nervousness and inability to use singing voice may have also contributed to the lack of significant differences in the singing performance test.

The above research highlights some of the benefits pattern instruction offers students when effectively presented and incorporated into instruction (Feierabend, 1984; Foley, 1975; Shuler, 1987; Yang, 2002). Experience with rhythm patterns has been shown to significantly improve students' rhythmic aptitudes, but the effects of tonal pattern instruction on tonal aptitude and singing ability remain unclear. Does tonal pattern instruction affect the development of students' singing voices? Subjects have used a greater singing range when imitating patterns than when singing a song (Flowers & Dunne-Sousa, 1990). Therefore, pattern instruction could help children to explore greater use of their singing voice better than approaches that use only traditional songs.

Purpose and Problem

This study will explore whether pattern instruction, specifically those designed by Gordon in his LSA, affects the development of a singing voice in children so that this information can by used to improve elementary general music instruction. The specific problem of this study is to determine if first grade students who receive tonal pattern



instruction experience greater gains in singing voice development than students who do not receive tonal pattern instruction.

CHAPTER TWO

RELATED RESEARCH

Singing Voice Development Measure

Singing Voice Development Measure (SVDM) (Rutkowski, 1996) is a standardized measure that provides music educators with a consistent and well-defined rubric for measuring singing voice development. While singing voice achievement is often the focus of research, SVDM provides music educators with means of assessing how students' singing voices are developing.

Rutkowski developed SVDM after concluding that other measures for measuring singing voices failed to separate singing intonation achievement from singing voice development, which confounded the results. She found that ability to use singing voice was necessary in order to sing with accurate intonation. However, those who can use their singing voices do not always have the aural skills to enable them to sing in tune. Likewise, some students with strong aural discrimination skills are unable to use their singing voices. She found that, unfortunately, the labels used for children who had not yet discovered their singing voices could be derogatory (monotones, inaccurate singers, backward singers, non-singer, problem singer, and partial singer) and failed to recognize the process of singing voice development. Originally, Rutkowski (1990) identified five stages of vocal development. Therefore, SVDM was comprised of the following levels (Rutkowski, 1990).

- 1 Children who use only speaking-voice inflection but do not sustain tones
- 2 Children who exhibit use of melodic contour and sustained tones, but use speaking range or a very high range
- 3 Children who use a very limited singing range, usually D3 to F#3
- 4 Children who use initial singing range, usually D3 to A3

5 Children who are able to sing over the register lift, B3-flat and above

To establish the validity of this rating scale, Rutkowski conducted a pilot study using a song familiar to her subjects. She believed that using an unfamiliar song as a means of assessment might prevent children from singing to their full potential because of insecurities, which would result in an inaccurate measurement (Rutkowski, 1990). Thirty-five kindergarten students were asked to perform the song, and their performances were audio-recorded. They were not given a tonality, starting pitch or tempo prior to recording their individual performances, because Rutkowski believed that this would provide the greatest accuracy in capturing the development of their singing voices. She also believed that children who are secure with their singing voices will usually sing a familiar song in the key in which they learned it. The children were recorded as they sang the song again a few days later (Rutkowski, 1990).

After engaging in practice examples to familiarize them with the rating scale, four qualified judges rated the recorded performances. Interjudge reliability ranged from .836 to .963, and performer consistency reliability was .918. Rutkowski experimented with singing "Ready-sing" prior to some subjects' performances. The judges found this helpful, but it did not yield a more reliable measure. Their interjudge reliability for the "Ready-sing" performances was .904. The judges noted that it was difficult to ignore intonation when rating the performances and to evaluate children's singing voices based only upon the performance of a song.

Therefore, for her main study, Rutkowski taught a familiar song and tonal patterns to a larger group of subjects. The music teacher reviewed the song with the children every week for a month before the testing, and Rutkowski reviewed the tonal patterns with them the day she administered SVDM (Rutkowski, 1990). The patterns were played on tone bells, then sung by the investigator, and echoed by the subjects.

"Ready-sing" was included on a descending tonic chord in the mode and meter of the familiar song, prior to each subject's recorded performance. Two of the judges from the pilot study with the highest interjudge reliabilities (.836 to .963) were used as judges for the main study. Rutkowski determined SVDM is a valid measure of the development of singing voice. After discussing with the judges, Rutkowski decided to use tonal patterns for future studies, rather than songs, because patterns do not take as long to teach and children do not need to memorize a text or the tonal and rhythm patterns themselves (Rutkowski, 1990).

In a study conducted in 1996, Rutkowski determined that more levels of singing voice development were necessary to accurately measure inconsistent singers who fall between two categories of her original scale. As a result, the original five levels of SVDM were revised to include nine levels. To accomplish this, Rutkowski included halves, rather than broadening the scope of the scale. Following is the revised scale used as a part of SVDM (Rutkowski, 1996).

- 1 "Pre-singer" does not sing, but chants the song text.
- 1.5 "Inconsistent Speaking-Range Singer" sometimes chants, sometimes sustains tones, and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2 "Speaking-Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2.5 "Inconsistent Limited-Range Singer" wavers between speaking and singing voice and uses a limited range when in singing voice (usually up to F3).
- 3 "Limited-Range Singer" exhibits consistent use of limited singing range (usually D3 to F3).
- 3.5 "Inconsistent Initial Range Singer" sometimes only exhibits use of limited

singing range, but other times exhibits use of initial singing range (usually D3 to A3).

- 4 "Initial Range Singer" exhibits use of initial singing range (usually D3 to A3).
- 4.5 "Inconsistent Singer" sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).
- 5 "Singer" exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).

Levinowitz (1998) and five of her graduate students tested the reliability of Rutkowski's SVDM in first through sixth grade general music classrooms. They also explored whether the use of singing voice is developmental, if children can dependably use their singing voice in major and minor tonalities, and if expectations for the use of singing voice in students between the first and sixth grades are appropriate. Subjects (n=170) from five elementary schools with diverse populations in southern New Jersey participated in this study.

Students were taught two rote songs one month prior to testing. Testing procedures involved individual performances in front of peers after the tonality of the song was set by the teacher with a I-V-I progression on guitar or piano. The teacher sang a cue for the student, took a preparatory breath to direct them, and audio-recorded the child's unaccompanied performance for scoring purposes.

The researchers concluded that SVDM, though originally designed for young children, is accurate through fifth grade. However, it did not produce satisfactory results for students in the sixth grade. Expectations for the use of singing voice in students between the first and sixth grades vary among practitioners, but the researchers suggested that current music curricula include systematic approaches to vocal instruction, with the aim of satisfying the National Content Standard (MENC, n.d.) "singing alone and with others." Finally, they recommended SVDM as a reliable measure for elementary level students.

The researchers concluded that students can more easily perform a song in major tonality than in minor tonality, which may relate to the musical background of the students. If instruction is not provided in all tonalities, students will likely be most comfortable singing in tonalities emphasized by their culture. The researchers provided a rationale for their song selection and noted that differences in song length may have been a cause of inconsistency. However, if minor tonality was not often used in the classroom prior to testing, it might naturally seem more difficult for the students to perform. The conclusion that major tonality is more easily sung than minor tonality after one month of exposure to the songs may be premature.

Furthermore, the validity of this study may have been affected by the administration process of SVDM, because taping sessions occurred among peers, rather than individually in a private setting. Although the researchers acknowledge that students' nervousness could account for some inconsistency in results, the presence of peers during taping sessions, no matter how accustomed students are to performing alone in front of others, can affect the results. For the present study, SVDM will be administered individually in a private setting.

The Effect of Instruction on the Development of Singing Voice

Several researchers have investigated singing voice development and the effect of different instructional techniques on singing voice development using SVDM as a measurement tool. These studies are some of the first to separate singing accuracy from

singing voice development and use. While some of the following researchers focused only on the development of singing voice, others included effects of piano accompaniment, small group instruction and tonal music aptitude.

Atterbury and Silcox (1993) focused on the effect piano accompaniment has on kindergartners' developmental singing ability. This study involved children in 15 kindergarten classes. Seven classes received a year of singing instruction with piano accompaniment, and eight classes received identical instruction without piano accompaniment. All students were recorded singing a four-phrase song individually in October and June, and their performances were rated by two judges who were unaware of the type of instruction that each child had received.

The rating scale that was used was an adaptation of Rutkowski's five-point Singing Voice Development Measure (SVDM):

1 "Pre-singer" does not sing but chants the song text

- 2 "Uncertain Singer" sustains tones, uses both speaking and singing voice
- 3 "Partial Singer" sings some phrases correctly but not entire song
- 4 "Singer" sings entire song correctly in one key

The adaptations occurred as a result of a pilot study in which the judging procedures for Rutkowski's measure were practiced and refined. Additionally, the highest level of Rutkowski's original measure (singer exhibits use of consistent extended singing range by singing beyond register lift: B3-flat and above) did not apply to this study, because the song used had a range of D3 to A3.

In May, a slightly adapted version of PMMA was used to determine music aptitude. Rather than asking students to circle the correct answer, the researchers made accommodations for students with weak fine-motor skills, and allowed children to draw a line through the correct answer. Furthermore, the test tape was stopped for an extra five

seconds after the first few examples, to ensure that all students were correctly responding to the task.

No significant differences were found in singing voice development between students who received a year of singing instruction with piano accompaniment and students who received identical instruction without piano accompaniment, nor did a significant difference exist between the experimental and control groups' composite scores for PMMA. However, subjects with high aptitude scored significantly higher on posttest song scores than those with low or average aptitude.

While SVDM is an appropriate criterion measure, the narrow range of the song used in this study may have affected the validity of the measure. Additionally, the authors do not state if the song was sung by each child with or without accompaniment, again calling the validity of the testing process into question. If no accompaniment was used, the students taught with piano accompaniment throughout the year would be at a disadvantage when tested individually. The reverse is also true. Also, the name of each student was stated prior to his or her performance. It is unclear how familiar the judges were with the students, but recognizing a child's name or voice may have influenced how the judges rated the performance, if they were aware of the students' past levels of achievement.

The alterations made to PMMA, as well as the condensing of Rutkowski's scale, may have adversely affected the results. However, using PMMA and SVDM with students at this age-level directly applies to the present study. Both tests will be used; however, this study will follow the testing procedures suggested by Gordon (1979) and Rutkowski (1986).

Rutkowski and Miller (2003) conducted a longitudinal study of elementary children's acquisition of singing voice. A group of 25 children from an elementary school

in Pennsylvania were studied from first through fifth grade to determine whether helping all students learn to use their singing voices within the current structures of general music instruction is feasible. Students attended music classes once a week for 40 minutes and were tested individually using SVDM at the beginning and end of first, third, and fifth grade.

For the testing, each child reported to a familiar room where he or she was audiorecorded echoing SVDM patterns sung by the teacher. All patterns were sung using text and the neutral syllable "bum." Half of the students sang with text first, the other half sang using "bum" first to control for order of presentation.

Significant differences were found between singing achievement at the end of first grade and at the beginning of third grade, as well as between the beginning and end of fifth grade. Children made greater gains in use of singing voice after first grade, and gains were still possible during fifth grade. By the end of fifth grade, 92% of the subjects were labeled as inconsistent singers or better.

The researchers wanted to learn if significant gains in the use of singing voice were made within a five-year stretch of music instruction. They were also interested in the number of students who could use their singing voice by the end of fifth grade. Hence, the criterion measure suited the study perfectly, because it measures the *use* of singing voice rather than singing accuracy. Because the present study focuses on the development of singing voice within a semester of first grade, SVDM will be used for similar purposes as in the study above.

In a different study, Rutkowski (1996) investigated using small-group instruction within the context of a traditional large-group setting, the relationship between tonal aptitude and the use of singing voice, and the length of time necessary for instruction to **Produce** significant results. The researcher concluded that using small-group instruction is

more effective than using only large-group instruction, the relationship between tonal aptitude and singing voice is minimal, and a year of instruction is necessary to produce significant changes. Furthermore, Rutkowski discovered that the mean of the control group decreased throughout the study, suggesting that merely using large-group music instruction can be detrimental to singing voice development.

This study was motivated by the increasing percentage of children under age 13 who are unable to sing simple songs. Both control and treatments groups of kindergartners (n=99) were given similar large-group instruction, but the treatment group received additional small-group or individual instruction within the same time frame. The students were tested with PMMA and SVDM at the beginning and end of the school year.

The impracticality of individual instruction -- or at least the pervasive perception of such among current music educators -- was discussed by Rutkowski. Though many researchers (Goetze, 1989; Goetze, Cooper & Brown, 1990; Rutkowski, 1996) conclude that individual/small-group instruction is necessary and significantly improves the development of singing voice, it is the present researcher's experience that a pervasive opinion about individual instruction being too time-consuming and difficult remains. Similar results regarding the importance of individualized instruction found through continued research on the development of singing voice might encourage current music educators to be willing and able to meet individual children's needs and find ways around the difficulties of individual instruction.

The present study can draw from Rutkowski's 1996 study. Tonal aptitude is measured and used as an instructional tool in presenting tonal pattern instruction, rather than as a dependent variable. Additionally, this study takes place over an 18-week period, rather than an entire academic year. This is due to the necessity of an

acculturation period (first 18-weeks of the school year), during which subjects are immersed in a variety of tonalities and familiarized with individual singing experiences.

Summary

The above studies allow one to conclude that, when used as intended, SVDM is a valid measure of the use of singing voice, and that children can be taught to sing within the confines of traditional general music class settings. However, in order for this to occur, students must be provided opportunities to perform individually, not only within a large group, because solely large-group instruction can be detrimental to singing voice development. Will the delivery of individual pattern instruction, which includes individual singing, help first grade students learn to use their singing voices?

CHAPTER THREE

METHOD

Subjects

The subjects in this study were predominantly white students in four first grade "classes" in a low-to-middle-income, semi-rural district of western Michigan. Due to a school schedule based on teams of four classrooms feeding into three creative arts classes, each of the four music classes involved in this study contained an intact class and four to eight additional students from another classroom. Students received instruction from a music specialist twice a week. Because solely large-group singing can be detrimental to children's singing voice development and individual singing can increase children's singing voice development (Rutkowski, 1996), all music lessons consisted of large-group, small-group, and individual singing activities, as well as rhythmic/movement activities. (Small-group singing was introduced prior to individual singing.) Lesson plans were based on Gordon's *Music Learning Theory* (MLT).

Design

This study was a repeated measures experimental design with a treatment group and a control group. The four creative arts classes were assigned to a treatment or control group (two classes each), controlling for aptitude as much as possible in the context of using intact classes (n=63). For 12 weeks, all subjects received instruction from their regular music teacher (the researcher) for 42 minutes, twice a week. The researcher administered *Singing Voice Development Measure* (SVDM), an instrument designed to measure children's use of singing voice (Rutkowski, 1986, 1990), prior to instruction. The treatment group received tonal pattern instruction, as defined and described in Gordon's *Learning Sequence Activities* (LSA) (Gordon, 2001), during the first five or ten minutes of every class period. The control group did not receive tonal pattern instruction during the first five or ten minutes of every class period, but all other instruction was identical for both groups. All students in the present study received individual/smallgroup opportunities in addition to large-group activities, whether it occurred during LSA (experimental group) or classroom activities (experimental and control groups). Following the treatment, SVDM was again used and gain scores were compared to determine if tonal pattern instruction had an effect on first graders' singing voice development.

Procedures and Criterion Measures

Prior to treatment (January 2005), all subjects were given the Tonal subtest of Gordon's Primary Measures of Music Audiation (PMMA), a standardized instrument designed to measure developmental music aptitude. Gordon recognized the importance of the difference between the measurement of music achievement and the measurement of music aptitude. Achievement refers to accomplishment, whereas aptitude refers to the potential to achieve. Gordon developed and standardized PMMA, which is a valid measure of developmental music aptitude for children younger than age nine. PMMA is a two-part (tonal and rhythm) test that does not require children to know numbers. It consists of same/different listening tasks. The child hears the name of an object, listens to two recorded patterns, decides if the patterns associated with the named object are the same or different, and circles one of two pairs of faces under a picture of the object named: one pair of faces is the same, the other pair is different. Each subtest contains 40 patterns. Raw scores are converted to standard scores and percentile ranks. Gordon (2001) believes that teachers need to know the aptitude level of their students in order to provide appropriate instruction that will balance students' challenges and successes with music. Likewise, knowledge of a student's aptitude is necessary to effectively administer

LSA to that student.

Administration of the *Tonal* subtest of PMMA followed the guidelines presented in the test manual. Prior to treatment, the researcher scored the *Tonal* subtest of PMMA and used the information about individual's tonal aptitudes from this test to appropriately adapt administration of tonal pattern instruction for the treatment group, as recommended by Gordon (2001). The treatment group (two classes) received individual tonal pattern instruction during the first five to ten minutes of every class period. With the exception of these tonal patterns, all subjects were taught identical material with similar instruction. Scores from PMMA also were used to control for aptitude when assigning classes to treatment and control groups.

LSA include both tonal pattern instruction and rhythm pattern instruction. However, only tonal pattern instruction was used as the treatment in this study. Gordon's tonal pattern LSA provide a systematic way for music teachers to focus on tonal audiation and the development of students' tonal skills. Individual aptitudes, as measured by PMMA, were marked on seating charts. The teacher began with Tonal Unit 1, Section A, Criterion 1 from the Tonal Register Book 1 and moved sequentially through the book. When approximately 80% of students achieved their potential according to their level of aptitude on any given criterion, the entire class moved forward to the next criterion (Gordon, 1990).

Gordon labeled the patterns as easy, medium, or difficult to audiate on the basis of research with large numbers of students of various ages (Gordon, 1997). Students listened to pairs of recorded tonal patterns and determined if they were the same or different. The results of the 'same' pairs were used to determine levels of difficulty. Patterns were labeled 'easy' if most students correctly determined that they were the same. If only half of the students were correct, the pattern was labeled 'medium.'

Patterns that only a few students could identify were labeled 'difficult.'

Each tonal pattern instruction session begins with the teacher singing a tonal sequence for the tonality and keyality of the day's set of patterns, performed using either a neutral syllable or tonal syllables, depending on the level of the students (Figure 2).



Figure 2 - Tonal Sequence in D Major

For Unit One, only neutral syllables are used because this unit remains at what Gordon refers to as the aural/oral level of learning, which is the first level of learning. At this level, students listen to and perform tonal patterns using a neutral syllable. Once the students are familiar with a set of patterns (meaning they have performed them as a solo in a particular tonality), they move to the verbal association level. At this level, solfege is associated with these patterns, which allows students to organize and retain patterns as new ones are learned. For this study, only major (do re mi fa so la ti do) and minor (la ti do re mi fa si la) tonal syllables were used. The following is an example of a set of patterns in D major.



Figure 3 - D Major Patterns from Tonal Unit 1, Section A, Criterion 1

The easy pattern requires students to sing the root and third of a tonic chord in D

major. The medium pattern requires students to sing a three-note descending arpeggiation of a tonic chord in D major, beginning on the fifth. The difficult pattern requires students to sing the fifth, then the root, and end on the third of a tonic chord in D major.

After the teacher establishes the tonality using the tonal sequence in Figure 2, the teacher engages the students in singing patterns as a class. These consist of tonic, dominant, and subdominant function patterns. The teacher sings a pattern without rhythm (all pitches are of equal length), pauses for a moment, breathes while giving a preparatory gesture to signal that the entire class should breathe too, and the students echo the pattern. The pause enables students to audiate, rather than imitate (Gordon, 1997). If a pause is not taken, students only imitate the tonal pattern and are not developing the aural skills necessary for becoming independent and comprehending musicians.

All pattern instruction in this study followed Gordon's guidelines. Once the tonality had been well-established through class patterns, the teacher sang the first of the three tonal patterns (easy, medium, difficult), breathed while giving a preparatory gesture to an individual student, and sang with the student. Depending on the activity, students were asked to respond with only the first pitch of the pattern, the resting tone, or the entire pattern. Only after a student successfully sang the response with the teacher (teaching mode) was he or she provided the opportunity to sing the pattern in solo (evaluation mode). Singing in solo occurred after a few other individuals had sung with the teacher, and all students had engaged in class patterns. Gordon recommends that no more than three individual patterns be given without also including a class pattern, in order to keep all students involved in the activity.

The teacher/researcher recorded student successes by making vertical lines and plus signs on the seating chart. If a child successfully sang with the teacher, a vertical line

was drawn underneath his or her name. If a child successfully sang the pattern as a solo, the previously drawn vertical line was crossed. Students were provided the opportunity to sing the medium pattern after successfully performing the easy pattern. This was true even for students with low aptitude. The same method was used to record these successes. Therefore, a student with high aptitude had achieved his or her potential if three plus signs (each representing an easy, medium, or difficult pattern) were made under his or her name on the seating chart. Thus, the teacher had an accurate record of student progress by using LSA.

SVDM was administered prior to treatment (February 2005) and at the end of the treatment period (May 2005). In preparation for administration of SVDM, the subjects practiced the patterns in the large-group setting, following the exact procedures used for individual testing. This is recommended by Rutkowski in her test manual. For individual testing, each child reported to a familiar, private room where his or her voice was audio-recorded as he or she echoed the researcher playing the patterns on a keyboard and then singing them.

Subjects were introduced to the following patterns four weeks prior to individual testing. Patterns involve identical rhythms.



Figure 4 - Rutkowski's Tonal Patterns (SVDM)

The teacher played one measure of the test on a keyboard, sang the pattern on "bum" or text, and the class echoed. To account for contradictory results from previous research on the use of neutral syllables or text for evaluating children's singing, half of the children sang the patterns first on text and then on the neutral syllable "bum;" the remaining children sang the neutral syllable first. This same procedure was followed for the posttest.

Two independent raters, both of whom were familiar with using SVDM to rate children's singing voices, rated the recorded performances. Both of the raters were certified music teachers with experience teaching elementary general music. CDs of all student performances were prepared for each rater. Performances were presented in random order on the CDs to ensure that the raters were unaware of the timeframe of the test (pre- or posttest) and group (treatment or control) to which they were listening. The raters were not familiar with any of the subjects, nor were they influenced by each other's ratings of the performances. The following rubric, which was drawn directly from Rutkowski's SVDM, was used to rate the performances.

- 1 "Pre-singer" does not sing, but chants the song text.
- 1.5 "Inconsistent Speaking-Range Singer" sometimes chants, sometimes sustains tones, and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2 "Speaking-Range Singer" sustains tones and exhibits some sensitivity to pitch but remains in the speaking voice range (usually A2 to C3).
- 2.5 "Inconsistent Limited-Range Singer" wavers between speaking and singing voice and uses a limited range when in singing voice (usually up to F3).
- 3 "Limited-Range Singer" exhibits consistent use of limited singing range (usually D3 to F3).

- 3.5 "Inconsistent Initial Range Singer" sometimes only exhibits use of limited singing range, but other times exhibits use of initial singing range (usually D3 to A3).
- 4 "Initial Range Singer" exhibits use of initial singing range (usually D3 to A3).
- 4.5 "Inconsistent Singer" sometimes only exhibits use of initial singing range, but other times exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).
- 5 "Singer" exhibits use of extended singing range (sings beyond the register lift: B3-flat and above).

Analysis

Pearson product moment correlation coefficients were computed to determine the interjudge reliability of SVDM. Means and standard deviations were calculated for SVDM pretests and posttests. Using a t-test, treatment and control group gain scores were compared to determine if tonal pattern instruction had an effect on first graders' singing voice development.

CHAPTER FOUR

RESULTS AND INTERPRETATIONS

Reliabilities

After all ratings had been collected, Pearson product moment correlations were performed to determine interjudge reliability between the two independent judges. Interjudge reliability was .90 for SVDM pretest and .93 for the posttest. These interjudge reliabilities were high and provide evidence of the validity of the criterion measure in the context of this study.

Means and Standard Deviations

Means and standard deviations were calculated for SVDM pretests and posttests. Theoretical and observed means and standard deviations are reported in Table 1 below. The theoretical means and observed means were similar, with the observed means being higher overall for the posttest than the pretest. The observed standard deviation was greater than the theoretical standard deviation, indicating a platykurtic distribution. In general, the treatment group tended to demonstrate less singing voice development than the control group in both administrations of the test.

Table 1 - Means and Standard Deviations

	Theoretical Mean	Theoretical Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Judge One Pretest	3.00	.67	2.72	1.28	3.55	1.18
Judge Two Pretest	3.00	.67	2.80	1.16	3.32	1.01
Judge One Posttest	3.00	.67	3.17	1.35	3.94	1.17
Judge Two Posttest	3.00	.67	3.18	1.25	3.80	.88

Treatment (N=30) Control (N=33)

The means and standard deviations for Judges One and Two combined were calculated for both pretest and posttest ratings (see Table 2). Again, the theoretical and observed means were similar, whereas the theoretical standard deviation was smaller than the observed standard deviation. Gain scores were calculated for all students. The average gain for the treatment group was .83, and the average gain for the control group was .85. These gain scores are similar.

Table 2 - Composite of Judges Scores

Treatment (IN-30))
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Control (N=33)

	Theoretical Mean	Theoretical Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Pretest	6	1.33	5.52	2.39	6.89	2.15
Posttest	6	1.33	6.35	2.56	7.47	2.40

A t-test was used to compare the gain scores to determine if tonal pattern instruction had an effect on first graders' singing voice development. No statistically significant difference (df=61) was found between the treatment and control groups. The tvalue was -.03, which was not significant at the .05 level. First grade students who received tonal pattern instruction did not experience greater gains in singing voice development than first grade students who did not receive tonal pattern instruction.

Discussion

There are several possibilities why the results were not significant. It may have been necessary to use a longer treatment period in order to detect a significant difference

between treatment and control groups. If the treatment lasted an entire school year, more progress may have occurred within the treatment group as more LSA units and criteria were taught and learned. However, trends in the data are not strongly in support of this interpretation.

This study was the researcher's first experience using LSA within a classroom setting. Her lack of experience administering tonal pattern instruction to students, as well as their unfamiliarity with the process, may have affected the results.

It is possible that tonal pattern instruction may have made a difference in another classroom in which students do not sing individually within the classroom setting on a regular basis. In this study, all children sang individually whether they were part of the control group or the experiment group. The researcher made a conscious pedagogical choice to continue incorporating individual instruction, because previous research suggests that doing so is best practice. If the students in this study experienced individual singing only during tonal pattern instruction, it is possible that the results would have been statistically significant. However, such results would not indicate that tonal pattern instruction was the specific reason for a difference between control and treatment groups, because singing individually within a classroom setting and outside of the context of LSA would also be a factor to consider.

In this study, children with low SVDM scores generally had difficulty reproducing the patterns given to them during LSA. This makes sense, because if a child is unable to use his singing voice above a certain range and a pattern requires him to do so, he will not successfully sing the pattern. Gordon did not design or intend for LSA to be used as a means of developing a child's singing voice. He designed LSA to build aural vocabularies (Gordon, 2001). Students with average and high tonal aptitudes who scored low on SVDM were often unable to reproduce patterns correctly, not because they were

hearing and aurally processing the pattern incorrectly, but because they had not yet gained control of their singing voices.

It is possible that strictly adhering to Gordon's recommendations on how to administer LSA and repeatedly asking students who have not yet found their singing voices to attempt to reproduce a pattern correctly, sets those students up for failure. Not coaching a student on how to find his or her singing voice during an opportune moment amidst LSA instruction may be a disservice to the child and to music education at large. Repeated failures of this sort might cause the student unnecessary frustration and aversion to singing in general.

While teaching LSA, the researcher/teacher found it extremely difficult not to break the flow of pattern instruction and coach students using hand signals, vocal slides, individual and group repetition, or verbal feedback, when she instinctively sensed doing so might be necessary and helpful. On several occasions, she successfully used each of these techniques. While LSA was not created as a means to improve singing voice development, if a student has not yet found his or her singing voice, it is possible that these techniques might be implemented within LSA instruction to evoke success from all students, whether they are singers or developing singers.

When a child's SVDM scores are viewed alongside LSA pattern charts, relationships are evident. The child who is a limited-range singer (scoring a three on SVDM) cannot yet sing above F3. He is successful at singing the easy pattern of Tonal Unit 1, Section A, Criterion 1 because the required D3 lies within his singing range. He cannot, however, successfully sing the medium pattern, because A4 is beyond the range of his singing voice. He may have average aptitude and be capable of audiating A4 within the pattern, but he cannot make his voice sing the pitch; thus, he fails to reach his potential for the first criterion. In Criterion 2, he masters both the easy and medium

patterns, because D3 is all that is required of him. However, he fails to sing the easy pattern in Criterion 3, because it, again, requires him to sing above his capable range. Thus, children might benefit by being taught how to use their singing voices prior to receiving pattern instruction. While this instruction may occur indirectly during an acculturation period, use of a singing voice appears to be a prerequisite to successfully progressing through LSA pattern instruction, or at the very least should occur concurrently. As Feierabend (1984) suggests, patterns that are easier to sing (e.g., small intervals, tonic patterns) should be presented prior to patterns that are more difficult to sing. It appears, as Rutkowski (1990, 1996) espouses, that singing voice development and aural/oral vocabulary development are separate constructs. Perhaps LSA, which are sequenced according to research on how difficult patterns are to audiate, might benefit from taking into consideration what is known about children's singing voice development.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

Purpose

With the intent of improving elementary general music instruction, the purpose of this study was to determine whether pattern instruction, specifically those designed by Gordon in his Learning Sequence Activities, affects the development of singing voice in children.

Problem

The problem of this study was to determine if first grade students who received tonal pattern instruction experienced greater gains in singing voice development than students who did not receive tonal pattern instruction.

Summary

It is known that children can be taught to sing within the confines of traditional general music class settings (Rutkowski & Miller, 2003). However, in order for this to occur, students must be provided opportunities to perform individually, not only within a large group, because solely large-group instruction can be detrimental to singing voice development (Rutkowski, 1996). This study focused on the delivery of individual pattern instruction, which includes individual singing, in an attempt to help first grade students learn to use their singing voices.

The subjects in this study were first grade students (n=63) from a low-to-middleincome, semi-rural school district. Students received instruction from a music specialist for two 42-minute sessions every week for 18 weeks. All music lessons were based on Gordon's *Music Learning Theory* and consisted of large-group, small-group, and

individual singing activities, as well as rhythmic/movement activities.

The researcher administered the *Tonal* subtest of Gordon's PMMA to determine subjects' tonal aptitude and appropriately level pattern instruction. Prior to instruction, students were introduced to Rutkowski's SVDM and individually pretested. Following an 11-week treatment period in which the treatment group received pattern instruction (defined in Gordon's LSA) for the first five or ten minutes of each music class, the researcher administered SVDM to all subjects in the treatment and control groups as a posttest.

Two qualified, independent raters scored SVDM performances. Their interjudge reliabilities were high. Gain scores were calculated and a t-test was performed to determine if pattern instruction has an effect on the singing voice development of first grade students. No significant difference was found.

Implications for Practice

It is important for music teachers to know the individual tonal and rhythmic aptitudes of their students in order to effectively deliver instruction (Gordon, 1997). Likewise, they must also be aware of individual students' ability to use a singing voice. Tonal pattern instruction, while helpful for building students' aural music vocabularies, has not proven useful in helping students develop a singing voice. If a child is unable to use his or her singing voice, class time spent asking him or her to reproduce pitch patterns may not be in the student's best interest, and may not be the best use of limited instructional minutes. Music teachers must help students acquire their singing voices prior to or concurrent with asking that they use these voices in tonal assessment activities, such as LSA pattern instruction.

Suggestions for Future Research

The challenge of assisting students in their vocal development remains. More studies must be conducted to determine successful ways to help students find their singing voices. Joyner (1969) suggested that vocal instruction may produce more benefits than aural skill treatments for children who struggle with pitch discrimination and vocal accuracy. Thus, the tonal pattern instruction designed by Gordon may not be the best sequence to enhance development of the vocal mechanism. Perhaps a different taxonomy of tonal patterns should be developed for children who have not yet found their singing voices. If Gordon's research-based taxonomy is modified, however, one must consider the implications a different taxonomy would have on children's aural skill development.

Children who can accurately discriminate pitch but fail to reproduce the pitches vocally (Goetze, Cooper, & Brown, 1990) will continue to struggle until their singing voices develop. Practitioners recognize that singing is a skill that can be taught (Apfelstadt, 1984; Goetze, Cooper, & Brown, 1990; Gordon, 1971; Gould, 1968; Jones, 1979; Roberts & Davies, 1975; Wolner & Pyle, 1933), and, with proper instruction, singing accuracy will increase with age. However, more research must be done on how to best instruct children in the development of their singing voices. We know that singing voice and pitch accuracy are different constructs (Rutkowski, 1990, 1996; Rutkowski & Miller, 2003), so future researchers must recognize the importance of gender differences, song instruction with and without text, song instruction without accompaniment or with root melody accompaniment, individual instruction, healthy vocal models, and children's singing ranges in order to conduct further studies on singing voice development. Does a full year of pattern instruction effect the development of children's singing voices

pattern instruction has a greater effect on singing voice development than with first grade students? Is the development of a singing voice a prerequisite to success in LSA? What effects do the use of hand signals, vocal slides, individual and group repetition, or verbal feedback have on singing voice development with or without individual pattern instruction? What other music methods and practices might assist children in singing voice development? Researchers must discover ways to assist children in finding and improving the use of their singing voices.

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