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A study of the associations between two means of vocal modeling by a male music teacher and third-grade students' vocal accuracy in singing pitch patterns

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A STUDY OF THE ASSOCIATIONS BETWEEN TWO MEANS OF VOCAL MODELING BY A MALE MUSIC TEACHER AND THIRD-GRADE STUDENTS' VOCAL ACCURACY IN SINGING PITCH PATTERNS

by

Timothy D. Montgomery

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Approved by

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APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro.

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MONTGOMERY, TIMOTHY D., Ed.D. A Study of the Associations Between Two Means of Vocal Modeling by a Male Music Teacher and Third-Grade Students' Vocal Accuracy in Singing Pitch Patterns. (1988) Directed by Dr. Hilary Apfelstadt. 83 pp.

The purpose of this study was to investigate possible differences between the effectiveness of two teaching strategies involving vocal modeling by a male teacher and the vocal accuracy of third-grade students. Factors of vocal modeling included: (a) means of vocal modeling (falsetto or normal voice), and (b) mode of tesing (patterns presented in falsetto voice, or patterns presented in normal voice).

Forty students in two intact classes participated as subjects. Each class was randomly assigned to one of two experimental treatments: E1, in which the falsetto voice was used for vocal modeling, and E2, in which the normal voice was used. Both classes were taught by the investigator. Subjects were administered a form of the <u>Boardman Test of Vocal Accuracy</u> as both pre- and posttest. The instructional period lasted twelve weeks. All songs were taught by rote, using the syllable <u>loo</u>.

Vocal tests were taped, transcribed, and scored by the investigator, and a random sample of 20% of the taped responses were verified by an independent judge. A $\underline{t}$ test on the pretest indicated that both groups were comparable at the outset of the study. Posttest data were analyzed by a two-way ANOVA. Results indicated that (a) the means of instruction received by the two groups did not make a significant difference in the vocal accuracy demonstrated, (b) the mode of testing did make a significant difference in the vocal accuracy demonstrated within combined groups, and (c) the interaction between means of instruction and mode of testing was not statistically significant.

The investigator concluded that instruction in falsetto rather than normal voice did not significantly improve vocal accuracy, but subjects did respond with greater accuracy to test patterns modeled in falsetto rather than in normal voice. The investigator recommended replication of the study as well as research concerning the stereotyping of males in elementary music education.

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CHAPTER I

INTRODUCTION

From the time of the singing schools in the early nineteenth century to the present, singing has generally been recognized as a basic musical activity in elementary music curricula. In a nineteenth-century publication, Lowell Mason (cited in Chosky, 1986) stated that the primary medium of music instruction should be the voice and that initial song learning should be by rote, with the students imitating a teacher's singing.

Current elementary music methods texts, influenced by various instructional approaches and research findings, still encourage use of the teacher's singing voice in providing students with a vocal model for accurate pitch matching (Chosky, 1986; Hoffer, 1982; Nye & Nye, 1985; Swanson, 1981). Swanson suggests that "because the range of the child voice lies within the range of the female voice, the woman teacher is at an advantage in providing a singing example" (p. 232). It would appear then, that if the teacher is male, he is at a disadvantage when providing a singing example; therefore, some means of accommodating for change of timbre and approximate octave difference between his voice and the child's deserves special attention. A survey of elementary music methods texts reveals virtually no references to the gender of the music teacher. Nye and Nye (1985) acknowledge that the voice of the male teacher is no longer as rare as it once was in elementary school music and suggest that male teachers make use of an instrument, a child's voice, or their falsetto voice, to produce the model for pitch matching (p. 276).

Recent research concerning the accuracy of children's vocal response to models of different timbres offers additional information concerning an ideal model for teaching children to sing. Petzold (1966) developed a test to measure the effect of timbre on vocal acuity by comparing melodic items presented in five performance media. Conclusions from this study indicated that children respond more accurately to a violin or soprano than they do to a piano or flute.

> The use of five different media [piano, soprano voice, trumpet, tenor voice and cello] in the composite test, particularly because the test items were presented in the soprano, tenor, and bass ranges, proved to be relatively difficult for children at all grade levels. Not only were comparatively few correct responses given, but the children said that they experienced considerable difficulty in deciding whether to sing in their normal range or to attempt to sing an octave lower. (p. 121)

Clegg (1966) also conducted a study comparing the tone-matching ability of first-grade children to pitches of different timbres. Pitches were generated by the following: male voice, female voice, piano, autoharp, pitch pipe, song bells, flutophone, and soprano recorder. The researcher reported that the response accuracy to the female voice was significantly higher than with other stimuli.

Sims, Moore, and Kuhn (1982) reported that "young children seem to have difficulty echoing sounds heard in a register other than the register in which their voices lie. These octave transposition abilities may require a level of sophistication not yet attained by 5- and 6-year-olds, but these abilities might be improved by training" (p. 107). The researchers also recommended that male teachers use "appropriately pitched instruments or a child's voice for pitch-making activities" p. 107).

In a study of the effects of different instructional programs on third- and fourth-grade students' ability to match pitches, Kramer (1985) made the following conclusions.

> The use of the male voice to set tonal examples for students to replicate can be confusing to the students. The initial vocal test, administered with the male voice as the examples in the regular vocal register, provided data that indicated that 50.7% of the students were inaccurate singers. The second test, administered with the musical examples being sung with the male falsetto voice, then produced the number of inaccurate singers at 30.34%, a decrease of 20.36%. This indicates that the children were attempting to match the lower pitch range of the male voice and were, consequently, being confused. (p. 111)

Despite the possibility of testing effects, the comparative difference in Kramer's study warrants further study.

Goetze (1985) also concluded that the male voice can be problematic as a model for children's singing. She recommended that female vocal models, rather than male, be utilized in future research of children's singing within western culture.

Although the practice of teaching singing by imitation has become a standard instructional approach, it appears that the issue of vocal modeling by males has rarely been addressed in elementary music education methods texts and has been given little attention in research. Researchers generally conclude that there may be some problematic factors necessitating alternative teaching approaches by male music teachers.

Need for the Study

Employing the teacher's singing voice to provide a vocal model continues to be a generally accepted means of teaching singing to children. The research literature appears to support the premise that the octave difference between the male singing voice and that of the child's singing voice may be one of the problems associated with the use of male vocal models in the elementary classroom. Because no definitive studies currently exist, there remains a need for research focused on the process of children making the octave transfer in order to match pitches vocally. This need was acknowledged by Petzold (1966) who suggested that a test be designed which would "provide valuable information with respect to the child's ability to hear in one octave and sing at a different octave" (p. 121). Because of the lack of empirical evidence supporting a theory regarding the use of the male voice as a vocal model for children, the present study was designed to measure the effect of one factor, the octave difference of the male vocal model, upon children's accuracy in singing pitch patterns.

Purpose of the Study

The purpose of this study was to investigate the effect of two means of vocal modeling by a male music teacher on third-grade children's vocal accuracy in singing pitch patterns. The two vocal modeling techniques were the use of the falsetto voice in the child's range and the use of the normal voice of the adult male, one octave below the child's range.

Statement of the Hypotheses

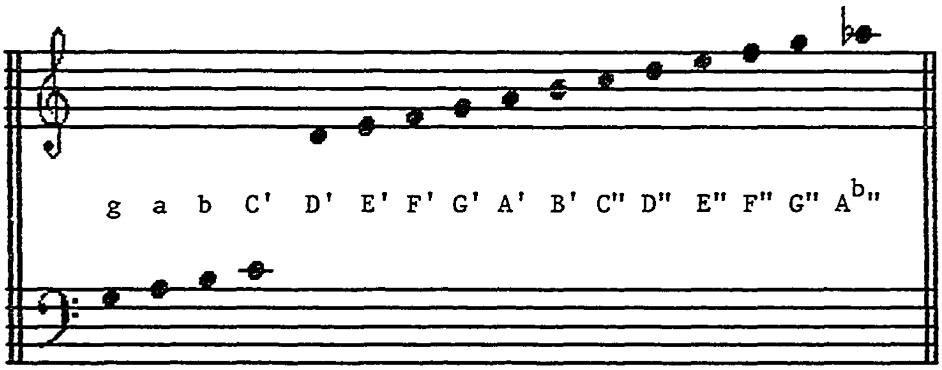
The problem investigated dealt with the associations between two means of vocal modeling by a male teacher and the ability of third-grade students to match melodic patterns accurately. The study was designed to test the following research hypotheses.

1. There will be no significant difference in the vocal accuracy demonstrated by two groups of third-grade students: those taught with a falsetto voice for vocal modeling (E1), and those taught with a normal voice (E2).
2. There will be no significant difference between groups in the vocal accuracy of responses to patterns modeled by falsetto as compared to patterns modeled in normal vocal range.
3. There will be no significant interaction effects between means of instruction and mode of testing.

Definition of Terms

To minimize ambiguity, terms used frequently in this study are defined below.

"Falsetto" refers to the upper register in the male voice. The registers of the male voice are notable for audible differences in terms of pitch, intensity, and timbre. Reid (1965) states that the range of the falsetto "will extend from G, below middle C, to E and A-flat, above high C, depending upon the normal tessitura of the given voice" (p. 141). To clarify, this range is illustrated by Figure 1 in the pitch notation system to be used for this study.



<u>Figure 1.</u> Falsetto Range

"Normal voice" of the male refers to the middle register sounding an octave below the child's voice, and is defined by Vennard (1967) as the "register between chest [suitable for <u>forte</u> singing] and falsetto, combining the best properties of both" (p. 250). In this study, vocal production was of a light quality within the normal tessitura of the adult male voice.

"Vocal accuracy" refers to the ability of the subject to reproduce vocally the exact pitches of the musical example with which the student was provided.

"Vocal modeling" refers to the process of using the teacher's singing voice to demonstrate pitch patterns and to teach songs by rote.

"Pitch pattern" refers to a group of two to five different pitches sounded successively to form a melodic unit.

Parameters of the Study

This investigation was designed to compare two approaches of vocal modeling by a male music teacher, and the association of modeling and vocal accuracy of students. Although teachers may use a variety of techniques to promote vocal accuracy in children, only the voice was used in this study. In this context, use of additional pedagogical techniques could contaminate results of the study.

Because this study was conducted with two intact third-grade classes of one elementary school in Danville, Virginia, its generalizability is limited to that population.

Significance of the Study

The information gained from this study may be of value to male elementary music teachers seeking to identify and implement an effective approach to vocal modeling in the classroom. In addition, the findings of this study may assist undergraduate music education instructors in providing appropriate pedagogical information and experiences for both male and female participants in college elementary music methods classes.

CHAPTER II

REVIEW OF LITERATURE

Introduction

In the previous chapter, it was noted that singing has traditionally maintained a primary role in the elementary school music instruction program. Historically, teaching young children to sing has emphasized rote learning, or a natural approach (Coleman, 1939), in which a vocal model is presented by a teacher and echoed by the student.

Few authors of elementary music methods texts discuss the possibility that the vocal model could be a male teacher. The consistent lack of reference to the male voice may indicate either a lack of expectation that the male voice will be used, or the assumption that it is inherently unsuitable as a vocal model for children. The fact remains, however, that male music specialists as well as male elementary classroom teachers do exist and need to know how to present a good vocal model for students. The few texts which acknowledge the use of the male voice imply that it can be problematic.

Although Nye and Nye (1985) stated that children are accustomed to hearing male vocal models on recordings of popular music, the authors referred also to the possibility of potential problems in the following statement.

> Once in a while a child will be confused by it [the octave-lower voice] and try to match its pitch. When this occurs, the male teacher should explain that his voice changed, and that he cannot sing as high as the children. He should play the song on an instrument that gives proper pitch, have a child who knows the song sing it, or sing falsetto. (p. 276)

Swanson (1981) expressed misgivings as to the suitability of the falsetto voice in describing it as having a "quality of tension about it that sets an unnatural example for children" (p. 217). Hoffer and Hoffer (1982), however, stated similar misgivings in the use of instruments other than the voice to provide a teaching model for children. The authors' statement that "an instrumental rendition is better than nothing, but the teacher's singing is the more desirable option" (p. 53) is based not only on the timbral difference between voice and instrument, but also on the inability of percussive instruments (bells or piano) to sustain pitch.

The present investigation was designed to study the relationship between two means of vocal modeling by a male music teacher and the vocal accuracy of third-grade students in singing pitch patterns. The literature reviewed in this chapter is divided into three sections:

(1) data pertaining to the nature of singing and singing skill development,

(2) data related to the relationship between auditory perception and vocal accuracy, and

(3) data related to the influence of difference in timbre on vocal accuracy.

Nature and Development of Singing Skill

Romaine (1961) defined the act of singing as a function of the vocomotor mechanism which includes the sound-producing organs of the throat. Singing is further described as a coordination of mind and body in controlling the sound-producing organs.

Goetze (1985) stated that singing involves psychomotor, cognitive, and affective elements. In addition to the physical operations of respiration, phonation, resonation, and articulation, "the mental processing of tones (cognitive processes) require pitch discrimination and tonal memory" (p. 12). Goetze suggested that the affective processes, which generate the desire to sing, are essential in that they engage both the physical and cognitive elements.

Accurate singing is defined by Joyner (1969) as a three-stage process: pitch discrimination (hearing), tonal memory (remembering), and vocal production (reproducing).

> In order to sing in tune a person must be able to do at least three things; firstly, he must be able to tell one pitch from another, thereby gaining a correct mental concept of the rise and fall of a melodic outline. Secondly, he must be able to recall successions of pitches organized into melodic patterns in order to be aware of "what comes next." Finally, he must have a vocal instrument capable of reproducing the succession of pitches in a melody, and that instrument must be able to make an immediate and accurate response to his intentions. (p. 116)

In a three-year study, Gould (1969) surveyed 602 elementary music teachers concerning characteristics and causes of uncertain singers (children unable to sing correctly the melody of a familiar song). The researcher stated that learning to sing is dependent upon the following concepts:

> (1) a concept of the singing voice and the motor skill of sustaining vocal sounds contrasted with the staccato vocal sounds of speech; (2) a concept of the difference between high sounds and low sounds and the motor skill of controlling the pitch levels of the voice in speech and song; (3) a concept of the sound of a musical tone and the mental skill of translating a tone heard by the ear into a tonal image; (4) a concept of melodic relationship and the mental skill of moving from one tonal image to another; (5) a concept of unison and the combined mental and motor skills of matching the vocal mechanism and the tonal image; (6) a concept of the vocal quality of the true singing voice and the combined mental and motor skills of producing and manipulating this singing voice with or without the mental-motor act of adding words. (p. 20)

Gould concludes that every physically able child can learn to sing, and that early childhood is the most effective time for providing remedial help with singing problems.

In an investigation of the extent of monotonism among school children of different ages, Bentley (1968) suggested that difficulty in accurate singing may result from a disturbance in the process of children listening to their own vocalization, or feedback. This results in deficient pitch discrimination and tonal memory which Bentley reports are "the two most fundamental factors without which the mental phenomenon that is music could not exist" (p. 25). Remedial treatment consists of encouraging singers to listen to and monitor more attentively both the stimulus sound and the sound of their own voices.

Smith (1973) also refers to feedback as part of "the mental process in which an individual conceives pitch, vocally produces the pitch, and monitors the pitch produced in order to adjust for errors"

(p. 37). He elaborates by stating that "the conception of the pitch appears to involve either a mental imagination of the pitch, or a response to an aural stimulus."

Apfelstadt (1983) summarizes the vocalization theories of current music education researchers in terms of a stimulus/response model (p. 3) (see Figure 2).

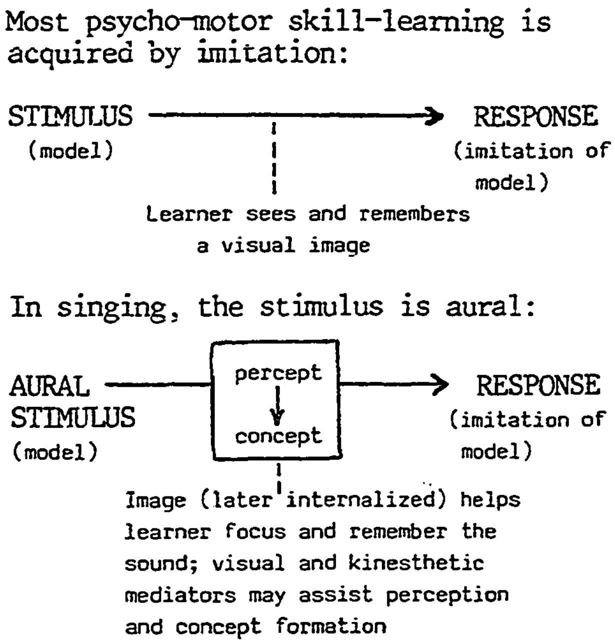


Figure 2. Vocalization illustrated by Stimulus/Response Model

Several researchers have proposed developmental sequences of singing skill development. Moog (1977) states that the learning of tunes is consistently a process of learning by imitation. He proposed the following five-step sequence: (a) acquisition by hearing, (b) acquisition by remembering, (c) storing of the tune remembered, (d) mental reproduction of the tune remembered, and (e) realization of the tune, through singing.

Davidson, McKernon, and Gardner (1981) describe the acquisition of song by children as a process reflecting general developmental trends. Their report is based on a five-year longitudinal study of early symbolic development in nine first-born, middle-class children. In addition to investigating the acquisition of song, the authors studied the subjects' development in six other symbolic domains of learning, including dance, drawing, language, storytelling, numbers, and symbolic play. The overall development was expressed in terms used primarily in Piagetian developmental theory.

The authors stated that "the child's initial grasp of the song consisted of the words, the rhythms, phrases, contour, but never accurate pitch values" (p. 309). It was noted that even though song acquisition varies to some extent among children, the following consistency in sequences of learning experiences existed: (a) mastery of the topology of the song, (b) mastery of the rhythmic surface, (c) mastery of the contour, and (d) acquisition of key stability.

Kramer (1985) investigated the effects of two music instructional programs on assisting third- and fourth-grade students to match pitches vocally. Singing taught by a traditional curricular approach was compared with an intervention method which incorporated "auditory, kinesthetic images, visual mediating strategies, and mnemonic association" (p. 19) as found in Gould's Specialized Program in Singing. Study results indicated that fourth-grade students demonstrated a more significant increase in singing ability than third-grade students. Kramer stated that disruption in the instruction of third-grade classes could have affected score results. He reported that:

> There were also an inordinate number of students with social problems and learning disorders that affected the social interaction of the class with regard to the process of learning . . . . These conditions may have affected the total third-grade score and could partially explain the findings that significance in the study was attributed to the fourth grade rather than the third grade. (p. 112)

An additional finding was that the intervention method improved the ability of the inaccurate singers to match pitches vocally. Kramer concluded that:

> The results of the study give empirical verification of the fact that environmental forces can assist or hinder the inaccurate singer in increasing his or her ability, and that learning how to sing is a scientific discipline that has a prioritized scope and sequence to the acquisition of its techniques. (p. 126)

It may be seen from the foregoing literature that there is agreement among music educators in describing singing as a complex and multi-faceted process. The coordination of the physical factors comprising the vocal mechanism has received considerable attention, as well as the cognitive and aural perception or processing of the stimuli prior to the vocal response. There was also agreement among researchers that vocal skill is a composite process which develops sequentially.

Relationships Between Auditory Perception and Vocal Accuracy

The relationship of auditory perception skill and vocal accuracy has been investigated extensively. Although researchers agree that a relationship exists, they propose differing theories about the exact nature of that relationship. Efforts of several researchers directly comparing measures of auditory perception and vocal production have yielded inconsistent results.

Pedersen and Pedersen (1970) conducted an investigation of the relationship of pitch discrimination with vocal pitch production among sixth-grade students. As a part of the study, additional relationships given consideration were (1) pitch discrimination and vocal pitch production with gender, and (2) pitch discrimination and vocal pitch production with knowledge of musical symbols, an indication of formal musical training. The researchers reported low-to-moderate relationships between not only pitch discrimination and vocal pitch production, but also between pitch discrimination and gender. They concluded that "the kind of understanding of music that was measured by the musical symbols test was more highly related to vocal pitch production than to pitch discrimination" (p. 271).

Zwissler (1971) studied the effect of instruction using the terminology "up" and "down" on first-grade students' pitch discrimination ability. She reported significant differences in pitch discrimination skills between six-year-olds identified as accurate singers and others identified as inaccurate singers. Accurate singers demonstrated superior pitch discimination skills. Because of the established relationship between singing ability and pitch discrimination, Zwissler recommended teaching pitch discrimination skills in conjunction with singing activities.

Geringer (1978) investigated vocal and instrumental pitch matching to determine if in some situations performance and perception of intonation are significantly different. The study began with subjects (N = 96) from four instrumental groups (string, wind, keyboard, and vocal) performing both an unaccompanied and an accompanied scalar pattern on their respective instrument. Half of the subjects then performed a second time after receiving differential verbal feedback. The other half of the subjects listened to their original performance and were allowed to adjust the pitch by manipulating the controls of a variable-speed tape player. Geringer reported that the subjects' intonation perception of their own performance was significantly less accurate than the actual performance of ascending scale patterns.

In a second study, Geringer (1983) examined the interrelationship between pitch discrimination and pitch matching ability of preschool and fourth-grade students. He reported a lack of correlation between pitch discrimination and vocal pitch matching ability. Geringer conjectured that "it is possible that pitch discrimination and pitch matching are simply two independent abilities, or that maturation and training are necessary to develop an interrelationship" (p. 98). The author concluded that "pitch matching is at least partly a function of physical development, where pitch discrimination can be viewed as a function of discrimination learning."

Petzold (1969) was concerned with identifying ways in which children (ages six through twelve) develop skills associated with auditory perception. His longitudinal study of three groups of children extended over a total period of four, five, and six years, respectively, and also included a series of one-year pilot studies dealing with perception of melody, timbre, rhythm, and harmony. Petzold found that age was a significant factor in the development of auditory perception, but with qualifications. He stated that it is imperative to focus instruction on the development of aural understandings when a child is in first grade. Finding that a plateau is generally reached by the third grade, Petzold suggested that a music program must continually provide children with challenging musical tasks so that they will continue to develop in the upper grades.

Numerous studies have been based on the theory that a student's singing ability may be adversely affected when pitch perception is deficient. The ability to differentiate changes in pitch has been considered essential prior to matching vocally a single pitch or pattern of pitches. Several researchers have reported the positive effects of training in improving pitch perception and vocal accuracy (Buckton, 1983; Joyner, 1969; Madsen, Wolfe, & Madsen, 1969; Roberts & Davies, 1976; Smith, 1970). Studies have employed various techniques to reinforce pitch perception, including visual and kinesthetic cues, instruments as a space frame, and vocal or instrumental instruction (Apfelstadt, 1983; Buckton, 1977; Creitz, 1943; Jones, 1971, 1979; Ramsey, 1983).

Several researchers have investigated the use of instruments as a space frame for developing motor-visual imagery. Creitz (1943) used a keyboard to provide a visual representation of tonal relationships. Students using a keyboard-assisted approach were found to demonstrate more improvement in attitudes toward vocal music, as well as learning and mastering more songs than a non-keyboard control group.

Visual representation of pitch concepts was central to a study by Jones (1979), who utilized two types of keyboard instruments in instruction with uncertain singers. The experimental group, which used a vertically arranged keyboard, demonstrated significant improvement with regard to problems of pitch direction, lack of attention, and low speaking voice.

Buckton (1977) examined the effects of two contrasting instructional programs (vocal and instrumental) on pitch discrimination, tonal memory, and vocal range in young children. One group received only vocal instruction; a second group was involved in instrumental training; the control group received traditional curricular music instruction. Buckton reported improved pitch discrimination and tonal memory resulting from both the vocal and instrumental programs. In addition, the instrumental program appeared to increase and sustain motivation, and keyboard playing provided visual reinforcement of melodic concepts.

Ramsey (1983) utilized resonator bells arranged vertically to compare the effects of instrumental experiences and noninstrumental experiences on preschoolers' melodic perception. The instrumental group achieved slightly, but not significantly, higher scores than the noninstrumental group in perception of melodic contour, melodic interval, and tonal center.

Apfelstadt (1983) examined the effects of melodic perception instruction on the pitch discrimination and vocal accuracy of kindergarten children. The three-group design was arranged in the following manner: (a) experimental group in which all singing was taught with visual and kinesthetic reinforcement of pitch; (b) experimental group in which all singing was taught by imitation; and (c) control group in which music instruction did not emphasize perceptual or conceptual development. The researcher concluded that "melodic perception instruction did not significantly improve pitch discrimination or vocal accuracy on rote songs, although it seemed to affect accuracy on pitch patterns" (p. 122).

Summary

While some researchers asserted that good vocal production is a prerequisite for the development of aural perception, others concluded that teaching auditory perception skills is essential for improving vocal deficiences. The majority of studies surveyed dealt with auditory perception; fewer dealt with tonal memory.

All researchers agreed that remedial measures are most beneficial in the childhood years. Petzold (1983) reported that a plateau is reached in auditory discrimination by the age of eight years. This is supported by his research findings that the greatest improvement in vocal skill development occurred in grades one through three.

Influence of Timbral Differences on Vocal Accuracy

Of relevance to the present study on the effect of vocal timbre upon children's singing were the tasks performed in Petzold's (1966) investigation of auditory perception of musical sounds by children in elementary grades. Petzold stated the following rationale for using sound sources differing in timbre and range as stimuli for subjects to echo-sing.

> The use of the different ranges would make it possible to determine whether children, upon hearing items in the bass or tenor range, could effectively adjust so their response could be made in the more normal soprano range of the child voice. (p. 119)

Petzold developed a test which utilized a piano, a flute, a soprano voice, and a violin to demonstrate melodic phrases. Test data for 348 subjects revealed greatest accuracy when phrases were presented on a violin. Subjects responded to voice, piano, and flute, in that order, with a lesser degree of accuracy. Petzold speculated that the difficulty subjects experienced when responding to pitches played on a flute may have been due to pitch register, which was one octave higher than children's singing range.

Clegg (1966) compared children's vocal responses to single tones and tonal patterns generated by male and female voices as well as four instruments: flutophone, recorder, piano, and song bells. Subjects (N = 796) for the study were first-, second-, and third-grade students. The following conclusions were based on the results of the study.

> (1) Effective tone matching activities may be conducted in the classroom with the use of the female voice or the piano in preference to the use of the song bells, recorder, or flutophone.
> (2) Tone matching activities may be less effective with inexperienced primary grade children by using the song bells, recorder, or flutophone because these

instruments have a range an octave higher than the child's singing range.
(3) The testing items could have been more limited in order to provide more conclusive results for the responses to the voices and instruments employed in the investigation. (pp. 68-69)

Hermanson (1971) investigated the effects of timbre on simultaneous vocal pitch acuity. Kindergarten and third-grade children sang with prerecorded four- and six-tone patterns. The tonal patterns were produced by a child's voice, a woman's voice, a piano, and an audio oscillator. Like Clegg, Hermanson reported that responses to the woman's voice were significantly more accurate than to other timbral models. Hermanson did not speculate as to why the adult female vocal model was found to be superior to the child's voice.

In a study investigating the effect of male and female models on the singing of first-grade students, Small and McCachern (1983) found the female model to be superior. Experimental groups were administered a pretest followed by a five-day training period with either the male or the female model. A posttest was administered at the conclusion of the treatment period. The posttest scores of the group with the female model were higher and the effect of the model was shown to be significant. From the description of both the treatment period as well as the subjects' prior experience with singing models other than female, it is not clear whether the difference in vocal models or the methods used in practice sessions with the subjects was responsible for the experiment results.

Sims, Moore, and Kuhn (1982) studied the effects of female and male vocal stimuli on the pitch-matching ability of five- and six-year old students. They compared vocal responses drawn from two populations. One group comprised thirty English students who had received musical instruction from a male music specialist. The second group, American students of the same age and grade level, received musical instruction from a female music specialist.

The researchers reported that "the significant difference found between the two countries indicated that the English children scored significantly higher on the pitch-matching test than did the American children" (p. 106). Also reported were a significantly higher percentage of correct responses to the female vocal stimulus than to the male. Conclusions from the study as well as implication for future research include the following.

> (1) Future studies should present stimulus items which are centered in the child's comfortable range.
> (2) Research might be conducted to investigate the possibility of compensating for children's octave transposition difficulties.
> (3) An exploration of the relationship between pitch perception and pitch reproduction in the areas of pitch-matching and octave transposition would also seem warranted. (p. 107)

Green (1987) researched the effect of three vocal models on pitch-matching accuracy of children in grades one through six (N = 282). The vocal models utilized for the study were an adult female soprano voice, an adult male tenor voice, and a nine-year-old child's unchanged voice. Subjects were tested individually on three separate occasions, each of which consisted of responding to a different prerecorded vocal model singing a descending minor third. The results of the study indicated that the vocal model had a significant effect on subjects' pitch-matching accuracy. Subjects deviated from the stimulus pattern least when responding to the child's voice, the female voice, and the male tenor voice, in that order.

According to a footnote (p. 33) identifying the persons who recorded the stimulus interval, both adults were professional singers. Green does not specify the vocal quality used by either adult, therefore, it is not certain if the male vocal model used normal range or falsetto. One might infer then that the difficulty subjects demonstrated in matching pitch accurately with both adult vocal models was due in part to the timbral difference between the subject's voice and the professional singer's. In addition, the octave difference between the male normal range and the subjects' may have been a confounding factor.

In discussing the implications of the findings for future research, Green recommended studies pertaining to the effect of instruction with a particular vocal model upon accuracy of pitch-matching by children. Further recommendations specified the need for studies in vocal modeling by males using normal range and falsetto.

Summary

Results of the foregoing studies indicate that a relationship exists between the timbre of the aural stimulus and the accuracy of children's vocal response. Researchers concur that vocal accuracy is jeopardized when young children are asked to echo sounds heard in a register other than the register in which their voices lie. There was agreement that the use of the female voice as the stimulus not only diminishes the need for children's octave transposition ability, but also more closely duplicates the timbre of the child's voice than do other instruments.

Despite the consistent agreement among researchers as to which vocal model is most advantageous, the issue of how the male music teacher may use his own voice to present a helpful vocal model has not been adequately researched. Because the writer found no studies utilizing different means of vocal modeling by a male teacher, the present study was undertaken to examine the relationships of two means of vocal modeling by a male music teacher and the vocal accuracy of third-grade students.

CHAPTER III

PROCEDURE

The purpose of this study was to investigate the possible differences between the effectiveness of two teaching strategies involving vocal modeling by a male music teacher upon the vocal accuracy of third-grade students. The choice of the third-grade level was based on a review of literature concerning the vocal development of children in primary grades. According to Gordon (1980), the primary grades (K-3) are the period of greatest potential progress since the musical abilities of children are still in a developmental stage. The authors of previous studies (Gould, 1968, 1969; Pitts, 1949; Romaine, 1961) have concluded that children in early primary grades (K-2) are in the process of identifying or discovering the division between the speaking voice and the singing voice. Based on findings from a series of six-year research projects concerned with primary children's perception of and response to auditory presentations of musical sounds, Petzold (1969) reported that "the large number of nonmelodic responses made by first-grade children are usually eliminated by second grade when greater vocal control is attained" (p. 254). By implication, Petzold suggests that children beyond second grade would demonstrate greater vocal stability. Because of the paucity of research dealing with children's vocal abilities at the upper limit of the developmental stage, the focus of this study was on third grade.

Subjects

With the consent of local administrators, teachers, and parents, students in two intact classes of an elementary school in Danville, Virginia, served as subjects for this study (see Appendix A). The school, described as middle-class by the Director of Instruction, consisted of 60% black students and 40% white. The school was selected for two primary reasons: (a) it would provide two third-grade classes of similar socioeconomic levels, racial balance, and academic abilities; and (b) its students were regularly instructed by a female music specialist and had no previous experience with a male music educator in the classroom.

Both classes were taught by the investigator, formerly an elementary music specialist himself. Each class, comprising twenty-one students, was randomly assigned to one of two experimental treatments: E1, in which the falsetto voice was used for vocal modeling, and E2, in which the normal voice was used.

Although third-grade students older than eight were included in the teaching, testing, and treatment procedures, their scores were excluded from the statistical analysis procedures. One other group not able to provide accurate data included students with profound hearing problems thus preventing their responding to auditory stimuli. The researcher reviewed student records for documentation of hearing problems and found no evidence that any student's scores should be deleted from statistical analysis for this reason.

Design of the Study

Introduction

The study consisted of four phases: (a) a two-week orientation period, (b) a vocal pretest, (c) a twelve-week treatment period, and (d) a posttest identical to the pretest. During the orientation period, the investigator taught the classes twice weekly. The instruction comprised music listening, rhythmic activities, and group singing aided by the use of recordings. To avoid contamination, no male vocal models were included in these recordings; all models were either children or adult female. At no time during these introductory sessions did the investigator use his singing voice, thus controlling this factor as a contaminating influence on the treatment. Greenberg (1976) recommends that tests be administered by adults whom the children know; therefore, the purpose of the orientation was to acquaint the students with the investigator, thus providing a control for test anxiety.

The Test

The test instrument was a form of the Boardman Test of Vocal Accuracy (Boardman, 1964). The Boardman test (BTVA), using melodic patterns (see Appendix B) rather than a single tone, requires subjects to sing a melodic pattern after it is presented three times. Gordon (1984) states:

> In the developmental music aptitude stage, he [the student] does not listen to individual notes; he listens to patterns of notes. The child is not interested in the individual

> note, but patterns of notes. So it is the pattern and not the individual note which the child audiates.

The use of patterns is also recommended by Jones (1971), who, in a study of uncertain singers in grades two, three, and four, reports that "most students matched patterns before they could match pitches" (p. 181).

The patterns used in the BTVA are similar to those found in children's vocal literature, as identified by Petzold (1960) in a study of elementary song textbooks. Despite the fact that the Petzold study was completed twenty-six years ago, the patterns' maximum range of a ninth is also consistent with the range found in current basal music texts. This aspect of the BTVA (i.e., its consistency with current vocal literature for children) provides content validity as defined by Hopkins and Julian (1981). They state that "for a test to have high content validity, it should be a representative sample of both the topics and the cognitive processes of a given course or unit" (p. 77). According to this criterion, therefore, the BTVA has high content validity.

An analysis of the BTVA revealed that the pitch levels of six of the patterns were higher than those recommended in research by Wilson (1970), Young (1976), Vaughn (1981), and Goetze (1985). These patterns were therefore transposed from the original keys to a lower key. This transposition facilitated use of the recommended range for children ages 8-10 years: C' to E" (Gould & Savage, 1972).

The BTVA used text to make the patterns more song-like, but the syllable <u>loo</u>, rather than text, was used in singing the test patterns for this study. Goetze (1985) concludes that "subjects sang most accurately individually with the syllable 'loo' rather than text" (p. 126). This modification of the BTVA is consistent with Gordon's (1984) conclusion that "the use of words of a song actually inhibit the learning of tonal syntax" (p. 143). He recommends that teachers should perform tonal or rhythm patterns on a neutral syllable followed by the student's echo with a neutral syllable.

Boardman reported a reliability coefficient of .97 which was established using a split-half reliability coefficient randomly selected and adjusted for length through the Spearman Brown Prophecy Formula. Reliability of the present form of the test instrument was computed on the pretest scores using a split-halves reliability correlation with Spearman-Brown adjustment for test length, resulting in a coefficient of .93.

To produce the test tape, ten patterns were randomly selected and each recorded twice: once by the investigator in falsetto voice, and once in normal voice. The twenty patterns were recorded in random order using a Pioneer cassette recorder, Model No. R500.

In a pilot test implemented in late summer of 1987, the investigator individually administered the BTVA to six eight-year-old and two nine-year-old children according to the original testing design which did not include the use of headphones. Six of the children evidenced difficulty in concentrating on the sound source and became easily distracted by extraneous sounds. Use of headphones to assist students' efforts to listen more intently to the test tape was considered advisable. On a subsequent pilot test administered to a separate group of six eight-year-old children, headphones were used. All of the children listened without distraction and demonstrated no difficulty in concentrating on the test tape.

Pretesting Procedure

A pretest was administered for purposes of establishing the level of vocal accuracy at the outset of the study. The subjects were tested in a quiet room equipped with a low table, two chairs, two cassette recorders (Pioneer R500), a microphone (Bolt, Berankek and Newman 501), and two pairs of headphones (Yamaha YHD-2). The time required for testing each subject was nine minutes.

To maintain consistency all instructions were written and read to each subject (see Appendix C). To prepare the subjects for the test procedure, the investigator recorded at the beginning of the test tape one sample pattern in falsetto, and one in normal vocal range. The subject was instructed to respond by echoing. When it was apparent to the investigator that the subject understood the procedure, the pretest was administered.

Treatment Period

The twelve-week treatment period followed the pretesting procedure. The investigator met each class twice weekly for thirty-minute instruction periods. Each music class was scheduled at approximately the same hour on Monday and Thursday or Friday: E1 on Mondays and Thursdays, and E2 on Mondays and Fridays. At least half of each thirty-minute class period was devoted to singing instruction comprising echo-singing of pitch patterns (see Appendix E) and learning of rote songs (see Appendix F). All songs were taught using the syllable loo. The investigator first sang the entire song using loo, then divided the song into phrases to be echoed by the students. This procedure was designed to facilitate tonal accuracy before the addition of text. To avoid contamination, recordings were not used for singing activities during the treatment period. Furthermore, only the concepts of tempo, dynamics, rhythm, timbre, and form were studied to avoid contamination from emphasis on melodic content. Each class received equal amounts of instruction in each concept area. Class periods included singing, performing on classroom percussion instruments, listening to recorded instrumental selections, and movement activities.

To evaluate the consistency in instruction, 50% of the classes were observed by the school's music specialist. The observer completed an observation form which indicated that the appropriate means of vocal modeling was used consistently with each group (see Appendix D).

Posttesting Procedure

At the end of the twelve-week treatment period the pretest was readministered as a posttest. The investigator replicated the testing conditions and procedures used in the pretesting.

Data Analysis

In order to assess subjects' vocal accuracy, their recorded responses had to be transcribed by the investigator into music notation. Scoring sheets were designed for this purpose (see Appendix H). The vocal tests were scored using the following procedure established by Boardman (1964) for each of the twenty patterns.

> (a) A score of _7_ indicated accurate matching of all tones in the pattern, without hesitation.
>
> (b) A score of _6_ indicated that the child "slid" into one or more of the pitches in the pattern, but eventually sang all accurately.
>
> (c) A score of _5_ was given for an exact transposition of the pattern.
>
> (d) A score of _4_ was given when a child maintained the general contour of the pattern, but sang incorrect intervals.
>
> (e) A score of _3_ indicated that the child maintained the general direction of the pattern but not the exact contour.
>
> (f) A score of _2_ was given for responses which ignored the contour of the pattern.
>
> (g) A score of _1_ was given when the child spoke rather than sang a response or did not respond at all. (p. 36)

Data were collected on 42 subjects, two of whom were not included in the statistical analysis due to their being older than eight. Data on both pretest and posttest were numerical scores based on an evaluation of the transcription of an individual subject's recorded responses. The scoring procedure for one pattern is illustrated in Appendix I. Each subject had four scores, each between 10 and 70: pretest falsetto (F1), posttest normal (N1), posttest falsetto (F2), and posttest normal (N2). Subjects' scores are reported in Appendix J.

To determine the reliability of the scoring, an independent rater, who is an experienced musician, scored a random sample of 20%

of the taped responses. Correlations between rater and researcher were computed and resulted in a coefficient of 0.99.

In this study the dependent variable was vocal accuracy as measured by the BTVA. The independent variables were: (a) means of instruction (E1/E2), and (b) mode of testing (falsetto voice/normal voice).

The data obtained from the pretest (total score: F1 + N1, with a possible maximum of 140 points) were analyzed by a *t*-test procedure to determine if there was a significant difference between groups at the outset of the study. Posttest scores of vocal accuracy (each student having an F and an N subscore maximum of 70 points each) were analyzed by a two-way analysis of variance (ANOVA) to determine if there were significant differences on the dependent variable due to: (a) means of instruction--comparing E1 with E2 on total score (F2 + N2); (b) mode of testing--comparing the F2 scores for combined groups with N2 scores for combined groups; and (c) interaction between means of instruction and mode of testing. An alpha level was established at $p = .05$.

CHAPTER IV

RESULTS AND ANALYSIS

The purpose of the study was to investigate the effect of two means of vocal modeling, falsetto and normal range, by a male music teacher on third-grade children's vocal accuracy in singing pitch patterns. The study was designed to examine the following null hypotheses (p = .05).

1. There will be no significant difference in the vocal accuracy demonstrated by two groups of third-grade students: those taught with a falsetto voice for vocal modeling, and those taught with a normal voice.
2. There will be no significant difference within combined groups in the vocal accuracy of responses to patterns modeled by falsetto as compared to patterns modeled in normal vocal range.
3. There will be no significant interaction effects between means of instruction and mode of testing.

This chapter is organized in two sections. The first section includes analysis of pretest data, and in order to answer the research hypotheses, the second section includes results of statistical treatment of posttest scores.

Pretest Data Analysis

In order to answer the research hypotheses it was first necessary to determine the level of vocal accuracy demonstrated by the students prior to the treatment period. Vocal accuracy was measured by a form of the Boardman Test of Vocal Accuracy (BTVA) which was administered as a pretest. The test results were analyzed using a *t*-test procedure and are presented in Table 1.

Table 1

t Test on Pretest Means

Group	*N*	Mean	Standard Deviation	*t*
E1	20	89.3	17.59	
E2	20	84.6	16.89	.86[a]

[a]not significant

The mean score for E1 (instructed using falsetto) was 89.3, and the standard deviation was 17.59. The mean score for E2 (instructed using normal range) was 84.6, and the standard deviation was 16.89.

Because the obtained *t* value was less than 2.021 (the critical value for 38 degrees of freedom at the .05 alpha level), it can be concluded that the group means for E1 and E2 are not significantly different. This indicates that the groups were not significantly different on the BTVA at the outset of the study.

Posttest Data Analyses

Having determined that the groups were comparable, the investigator used an analysis of variance (ANOVA) procedure to analyze the data. The program Statistical Package for the Social Sciences (SPSSx) was utilized to test for significant differences between posttest scores.

Table 2 shows group mean scores on the two types of pitch patterns used in the posttest.

Table 2

Group Mean Scores on Falsetto and Normal Patterns

Group	*N*	Falsetto Mean	Normal Mean
E1	20	55.65	44.90
E2	20	51.60	46.50
Total	40	53.63	45.70

Table 2 indicates that for E1, the mean score on falsetto patterns was 55.65, and the mean score for normal range patterns was 44.90. For E2 the mean score for falsetto patterns was 51.60, and the mean score for normal voice patterns was 46.50. For the combined groups the mean score for falsetto patterns was 53.63, and for normal voice patterns the mean score was 45.70. It can be seen that both groups scored higher in response to patterns modeled in falsetto than to those modeled in normal voice.

Table 3 gives ANOVA results for the posttest.

Table 3

Analysis of Variance for Posttest

Main Effects	Sum of Squares	df	Mean Square	F	Significance of F
Means of Instruction	30.012	1	30.012	.292	.590
Mode of Testing	1256.112	1	1256.112	12.239	.001[a]
Interaction:					
Means of Instruction x Mode of Testing	159.612	1	159.612	1.555	.216

[a]significant beyond .05

The first main effect, means of instruction, has a calculated F of .292 with one degree of freedom, resulting in a probability level of .590. The second main effect, mode of testing, has a calculated F of 12.239 with one degree of freedom, resulting in a significance of .001. This indicates that there is no significant difference between groups taught with falsetto and those taught with normal voice. There was, however, a significant effect within combined groups due to the mode of testing. That is, all subjects regardless of means of instruction responded with greater accuracy to patterns modeled in falsetto than to patterns modeled in normal voice.

Interaction between the independent variables in this study (means of instruction and mode of testing) would exist when the effect of the method of instruction upon the vocal accuracy scores is <u>not</u> the same in the two different modes of testing. Graphically plotting the cell means is the recommended way (Glass & Stanley, 1970; Hinkle, Wiersma, & Jurs, 1979) to present and examine the existence of interaction. Results from the posttest ANOVA are graphically represented in Figure 3.

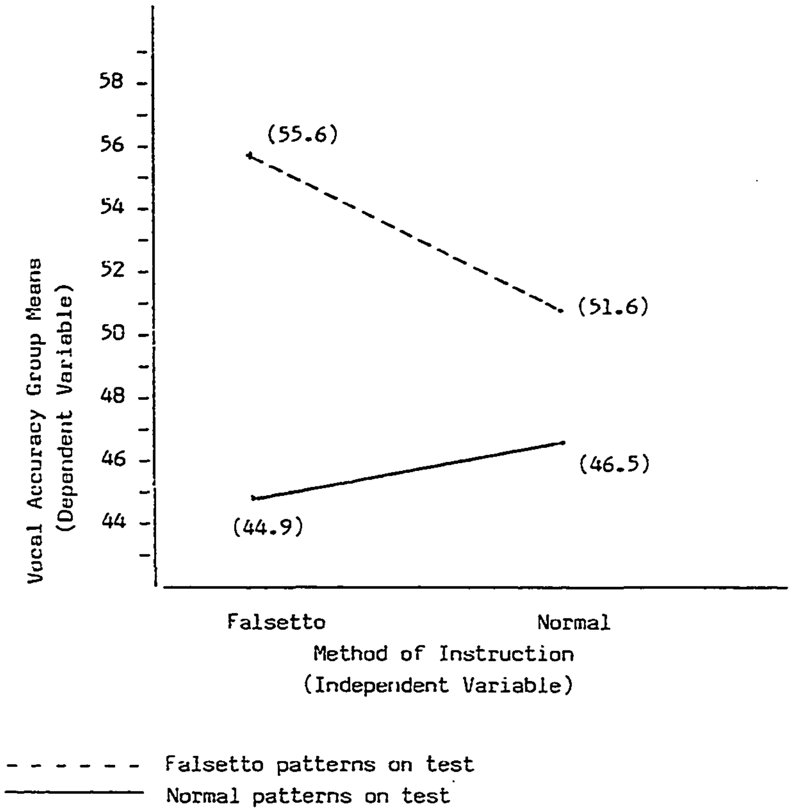


Figure 3. Graphic Representation of Mean Posttest Scores

Figure 3 illustrates a plotting of cell means in order to explain the nature of interaction between the independent variables. While ANOVA was nonsignificant at the .05 level, Figure 3 indicates that minimal interaction did occur. Hinkle, Wiersma, and Jurs (1979) state that when no significant interaction occurs, the lines connecting the cell means in an interaction plot are parallel or nearly parallel; a significant interaction is illustrated by nonparallel lines. From Figure 3, it can be seen that the lines connecting cell means are not parallel but move in opposite directions indicating that there is minimal interaction.

Summary of Analyses

> Null Hypothesis 1. There will be no significant difference in the vocal accuracy demonstrated by two groups of third-grade students: those taught with a falsetto voice for vocal modeling, and those taught with a normal voice for vocal modeling.

From the ANOVA procedure on the posttest scores it appears that the means of instruction received by these groups did not make a significant difference in their demonstration of vocal accuracy in pitch-matching. Consequently, in this study null hypothesis 1 is retained ($p > .05$).

> Null Hypothesis 2. There will be no significant difference within combined groups in the vocal accuracy of responses to patterns modeled by falsetto as compared to patterns modeled in normal range.

In contrast to null hypothesis 1, there is evidence in the ANOVA procedure that the mode of testing did make a significant difference in the vocal accuracy demonstrated within the combined groups. That is, both groups responded with significantly greater accuracy to falsetto patterns than to those in normal range. Based on these results, null hypothesis 2 was rejected beyond the .05 level.

> Null Hypothesis 3. There will be no significant interaction effects between means of instruction and mode of testing.

From Table 3 it is evident that the interaction between main effects was not statistically significant. This lack of interaction was illustrated in graph form in Figure 3. Consequently, null hypothesis 3 is retained ($p > .05$).

CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate possible differences between the effectiveness of two teaching strategies involving vocal modeling by a male teacher and the vocal accuracy of third-grade students. Factors of vocal modeling included: (a) means of vocal modeling (falsetto or normal voice) utilized in music instruction, and (b) mode of testing (patterns presented in falsetto voice, or patterns presented in normal voice).

Forty third-grade students in two intact classes of an elementary school in Danville, Virginia, participated in the study. Although the classes were not randomly selected, they were comparable according to socioeconomic levels, racial balance, and academic abilities.

The study consisted of four phases: a two-week orientation period, pretesting, a twelve-week treatment period, and posttesting. The orientation period allowed the students to become acquainted with the investigator before being pretested with a revised form of the Boardman Test of Vocal Accuracy (BTVA). All vocal responses were taped and transcribed into notation by the investigator. The treatment period spanned twelve weeks, during which each class met twice weekly with the investigator. The conceptually-based instruction included singing, listening, movement, and performing on classroom percussion instruments. All songs were taught by rote and were modeled in phrases using the syllable "loo," either in falsetto (E1) or normal range (E2), then echoed by students. At the conclusion of the treatment period, the pretest was readministered as a posttest. The taped responses were transcribed into notation by the investigator and scored on a seven-point scale for pitch accuracy. In order to determine the reliability of these scores, a random sample of 20% of the total responses was transcribed and scored by an independent rater.

A _t_ test on the pretest scores revealed that the groups were not significantly different at the outset of the study. Two-way ANOVA was used to analyze posttest scores. Results were as follows:

1. There was no significant difference in the vocal accuracy demonstrated by the group in which falsetto modeling was used (E1) as compared to the group in which normal vocal range was used for modeling (E2).
2. There was a significant difference among combined groups in the vocal accuracy of responses to patterns modeled by falsetto as compared to patterns modeled in normal vocal range. The subjects responded with greater accuracy to patterns modeled by falsetto.
3. There was no significant interaction effect between means of instruction and mode of testing.

Discussion

Use of the male voice as a vocal model for children has received minimal attention in research and elementary music methods texts. Researchers (Green, 1987; Kramer, 1985; Sims, Moore, & Kuhn, 1982) are in agreement that the male voice is problematic as a vocal model for children because it is an octave lower than the child voice. All studies concerned with the association of vocal modeling and vocal accuracy have compared the male voice to the female and/or the child's voice. In these studies the male voice has been shown to be the least preferred choice as a vocal model. It was the intent of this investigator to focus solely on the male voice as a vocal model. In the present study it was hypothesized that use of the falsetto voice as compared with normal voice, both in instruction and as a stimulus for pitch-matching, would yield no significant difference in vocal accuracy of third-grade students.

The results of this study indicate that at the outset of the experiment the group mean for E1 was 89.3 and for E2 was 84.6. Both groups showed gains after instruction, increasing their mean scores to 100.5 (E1) and 98.10 (E2). The differences were not significant at .05 level, however, indicating that means of instruction did not affect students' demonstration of vocal accuracy in matching pitch patterns as measured by the BTVA. Given the fact that all subjects demonstrated greater vocal accuracy in response to patterns modeled in falsetto, one might expect that the posttest scores of the group instructed in falsetto (E1) would significantly surpass those of subjects instructed in normal voice. Results of this study indicated otherwise. It might be conjectured then, that in this study the effect of the octave difference between the subjects' and the investigator's vocal ranges was minimized by the investigator's consistent use of a light vocal quality within the normal tessitura of the adult male voice. Had the investigator used a heavier vocal production (i.e., sung in chest register, resulting in louder and more forceful singing), the subjects might have attempted to imitate the timbre of this model by singing in chest voice. In doing so, subjects would have sacrificed vocal accuracy since the chest voice range is relatively restricted.

The gain in mean scores could be attributed to several factors which individually or collectively may have affected a change in scores. The first factor may be considered an inherent weakness in a pretest-posttest design; subjects' familiarity with the testing procedure or "test-wiseness," may have been responsible for improved posttest scores. A second factor was the possibility that subjects experienced less anxiety on the posttest because they were then more familiar with the investigator who administered the tests. Thus their scores may have improved for that reason.

A third factor related to testing was the fact that some subjects appeared to have difficulty when asked to repeat patterns on "loo." It was noted that several students hesitated on pretest patterns before responding with incorrect syllables. When reminded of the correst response, some students appeared distracted by this restriction. It was obvious that singing on a neutral syllable was an unfamiliar task. Consistent use of "loo" during the treatment period may have accounted for the increase in vocal accuracy as well as for the lack of hesitation or use of incorrect syllables on the posttest.

Analysis of differences between individuals' pre- and posttest scores also reveals that most students (97.7%) demonstrated greater pitch accuracy following vocal and melodic instruction by a male teacher (see Appendix K). It could be hypothesized that the consistent and concentrated attention given not only to modeling and echo singing, but also to teaching of melodies in phrase units was as beneficial as the means of modeling employed.

This study revealed that during testing, children sang with significantly greater accuracy in response to patterns modeled in falsetto rather than in normal range. Since the association of vocal modeling in falsetto with accuracy of pitch pattern matching has not been investigated prior to this study, there is no existing research literature which supports this finding. There are, however, numerous studies (Clegg, 1966; Green, 1987; Hermanson, 1971; Petzold, 1966; Sims, Moore, & Kuhn, 1982; Small & McCachern, 1983) suggesting that children match pitch more accurately with a stimulus in the same octave as their voice than with the octave-lower range of the male voice. Despite octave differences between the types of vocal models used in the present study, both models had in common a light tone quality which is consistent with the child voice. As shown by the group means reported in Chapter IV, it would appear that the use of falsetto by a male teacher is an effective means of vocal modeling.

A statement presented in Chapter II implied concern about the suitability of the falsetto voice as a vocal model for children. Swanson (1981) stated that vocal tension is inherent in falsetto, and the investigator inferred that when used as a stimulus, falsetto might elicit a similar response. In the present study, neither the investigator nor the music specialist who was present on a regular basis observed any students singing with the physical mannerisms associated with tense vocalization such as stretched neck, protruding jaw, or furrowed brow. Because it is possible, however, that some men may not understand the vocal production of the falsetto voice and may, therefore, use it incorrectly, if at all, a need exists for the development and implementation of instruction in elementary music methods courses that will assist male students in understanding the falsetto voice. Individual attention to the use of falsetto may also be warranted in applied vocal study by prospective vocal music teachers.

Despite the results indicating that means of instruction was not significantly associated with vocal accuracy, both the investigator and the specialist observed that the group (E1) in which falsetto modeling was utilized demonstrated greater accuracy in group singing than the group (E2) in which the normal voice was used. While the present study was not designed to measure the effect of means of instruction on accuracy of group singing, the fact remains that the observed difference in group singing was not reflected in measurements of individual responses.

Goetze (1985) suggested that there is one difference in the skills required in group singing as compared to individual singing, that being the need to attend to and monitor "one's own voice to control pitch . . . in the presence of a simultaneous external sound stimulus" (p. 133). She recommends development of techniques for teaching skills unique to group singing. Based on the observations made in the present study, there is need for more information on the association of group instruction and individual testing.

Recommendations

Several recommendations are appropriate in view of the results of this study. Some have implications for future research, while others have immediate application to classroom practice and methodologies.

The first is that replication of this study is needed with a different and larger sample. Since this study was conducted with a relatively small sample--all subjects being drawn from a single elementary school--implications of the findings for the general population are limited. To provide more information on the exclusive use of a male vocal model, additional studies should be conducted in a large number of schools with samples drawn from various socioeconomic and academic ability groups.

A second recommendation is that replication of this study should include a longer treatment period. Whereas the present study spanned approximately one-half of the school year, further research would ideally encompass an entire school year or be conducted longitudinally over several years. This additional time might help to determine more definitely an association or lack of such between vocal accuracy and instruction utilizing different means of vocal modeling. It might be, for example, that the minimal interaction noted in this study could attain significance or cease to exist altogether upon replication.

A third recommendation is that replication of this study should include several grade levels. This additional evidence might help determine the most effective vocal models for children at different ages and levels of vocal development. Based on the results of the present study, the possibility exists that students adapt to the normal voice of the male when their own concept of the distinction between the singing voice and the speaking voice is clearly established. On the other hand, younger children who do not fully understand the difference between their speaking and singing voice may benefit from models presented in falsetto.

A fourth recommendation is that replication of the present study is needed to determine the effect of vocal modeling in terms of pitch-giving skills for initiating singing. Is it necessary, for example, for the male to use falsetto voice only for establishing pitch, and then just as effective to revert to normal range?

A fifth recommendation is that the present study be replicated with the addition of a third group instructed by a male using a heavy vocal quality within the normal tessitura of his voice. Based on the results of the present study in which both vocal models had a light quality in common, additional research is needed to determine the effectiveness of vocal models differing in vocal quality as well as octave range.

A sixth recommendation is that further study is needed to investigate the association of group instruction and individual testing. If elementary music instructors continue to emphasize activities such as group singing, it follows that some means of measuring the accuracy of group singing, rather than individual singing, is warranted.

A seventh recommendation is that research is needed concerning the stereotyping of males in elementary music education. As stated previously in the review of literature, the lack of reference to the male voice as a vocal model indicates an assumption that females are the expected teachers of children. In addition to the specific issue of vocal modeling by male teachers, there may be other factors that men perceive as pertinent to professional preparation for teaching music to children.

Finally, male elementary music teachers should be encouraged not only to use their normal singing voice in vocal modeling, but also to use falsetto voice as frequently as possible to encourage accurate pitch matching by students. Preparation of male elementary music teachers should include more individual vocal study in addition to methods instruction that enables the male teacher to use either the normal singing voice or the falsetto voice with equal ease as an effective vocal model for children.

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APPENDIX A

FACSIMILE OF LETTER TO PARENTS OF SUBJECTS

Dear Parents,

I am a doctoral student in music education at The University of North Carolina at Greensboro. I am presently conducting research for my dissertation which is a study of two ways of teaching singing in third-grade classes.

For the next twelve weeks I will be teaching music in two of the third-grade classes at ____________________. Your child's music class is participating in this study. A majority of the music classes will be observed by either the regular music specialist, __________________, or another music teacher. All data will be treated with strict confidentiality.

This investigation is being conducted with the permission of the Danville Public School Administration, the principal ____________, and the classroom teacher. If you have any questions, please feel free to contact me at the __________________ Music Department (________________) where I also teach, or at home (_________________).
Thank you for your cooperation.

Sincerely,

Tim Montgomery
Visiting Music Teacher

APPENDIX B

FACSIMILE OF BOARDMAN TEST OF VOCAL ACCURACY


1.
2.
3.
4.
5. Originally in Ab
6. Originally in Ab
7.
8. Originally in Ab
9.
10.
11.
12.
13. Originally in G
14. Originally in C
15.
16.
17.
18. Originally in C
19.
20.

APPENDIX C

TESTING SCRIPT

TESTING SCRIPT

TM: "Hello (student's name). Today we're going to play an echo game with some short melodies. To practice I'll sing you a melody three times, then you sing it back one time. At times I will use my regular singing voice, and at other times I'll use a lighter and higher voice. When you echo what I have sung, use your regular voice."

(Proceed with one practice pattern sung once in falsetto, and once in normal octave. If the student understands the directions, the test will start.)

TM: "I've recorded all of the melodies on this tape. You'll hear each one three times, then I'll tell you when it's your turn to echo. Any questions?

(If there are no questions the test will proceed. Each time after the third repetition, TM will say, "Your turn.")

APPENDIX D

OBSERVATION FORM

OBSERVATION FORM: THIRD-GRADE MUSIC CLASSES

In questions 1 and 2, circle the appropriate responses to each as you observe instruction in experimental groups E1 and E2.

1. In the E1 Group, does the instructor consistently use only falsetto for all vocal modeling?

YES NO

2. In the E2 Group, does the instructor consistently use only normal singing octave for all vocal modeling?

YES NO

Answer questions 3 and 4 after observing both classes in one day.

3. Apart from vocal modeling method, is the remainder of the lesson taught in the same way to both groups?

YES NO

4. Is equal time allotted to the same activities in both groups?

YES NO

If not, identify any inconsistencies you notices:

APPENDIX E

VOCAL WARM-UPS

APPENDIX F

LIST OF SONG MATERIALS

List of Song Materials

Because all elementary music specialists in the Danville, Virginia, public schools follow the same curriculum, the songs used in this study were chosen from a specified body of repertoire being taught to all third-graders in the city. The following songs were taught during the orientation and treatment periods.

Music Book - 3 (New York: Holt, Rinehart and Winston, 1981)

Long John
The Siamese Cat Song
Old Texas
Snady Land
Donkeys and Carrots
My Aunt Grete
The Ants Go Marching
Tinga Layo
Tongo
African Noel
Deck the Halls

Music Book - Kindergarten (New York: Holt, Rinehart and Winston, 1981)

Skin and Bones

APPENDIX G

SAMPLE LESSON PLAN

SAMPLE LESSON PLAN

THURSDAY AND FRIDAY, OCTOBER 20 & 21

Objective: By clapping and chanting the melodic rhythm of "Tinga Layo," students will explore the concept of rhythmic grouping in both even and uneven units ( ) as the underlying beat remains steady.

Students will indicate recognition of familiar pattern by raising hand when listening to recording of "Grand Walkaround."

Materials: Song: "Tinga Layo" (Music Book 3, p.49)
Recording: "Grand Walkaround" by Gottschalk-Kay, (Michael Bennett. Ear Bending. Pop Hits Publications, 1977.)

Hand drum

Intro/Warm-up: Vocal and Clapping.

1. Teacher models patterns using "loo" and students echo; repeat process until vocal accuracy is attained.

2. Teacher claps each pattern and students echo; repeat process until rhythmic accuracy is attained.

a. 
b. 
c. 
d. 
e. repeat d, clapping and chanting text simultaneously, "Come little donkey, come."

Process:

1. Review vocal patterns 3, 4, 5 by combining into phrases, still using "loo."

2. Teacher sings entire song, then models phrase-by-phrase; students echo as teacher prompts. Words are added when accuracy of melody is apparent.

3. As teacher sings word "Layo," he claps rhythmic pattern "e" as accompaniment; repeat process with students clapping.

4. Class is divided into 2 parts to sing antiphonally: half will sing "Tinga Layo" and other half responds with text "come little donkey, come."

5. Entire class adds rhythmic pattern "e" whenever the words "Layo" and "come little donkey, come" are sung.

Transfer:

1. Students will listen for same rhythmic pattern in the orchestral arrangement of "Grand Walkaround." Upon recognition students will raise hands.

2. Upon subsequent recognition, class will clap rhythm with music.

Review and Evaluation:

1. Class moves into circle and reviews "My Aunt Grete" with pat-clap-clap ostinati, and movement.

2. Repeat "Tinga Layo" with class singing entire song and clapping the ostinato.

NEXT CLASS: Review "Tinga Layo" and outline form by same/different analysis.

APPENDIX H

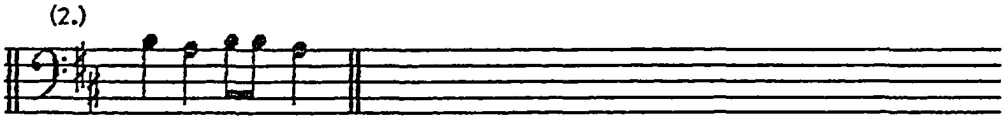
TRANSCRIPTION AND SCORING SHEETS

No. _____ Pretest Posttest E1 E2

Stimulus Response F:_____ N:_____

(1.)

(2.)



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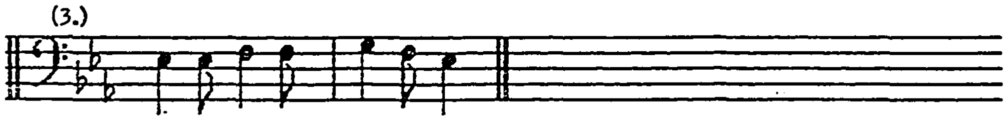

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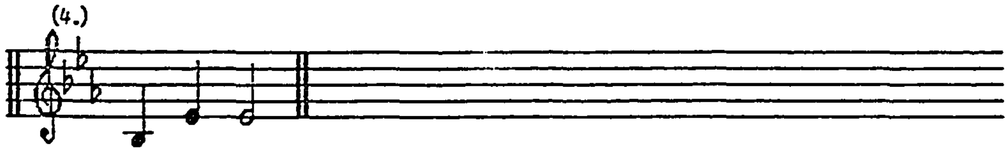

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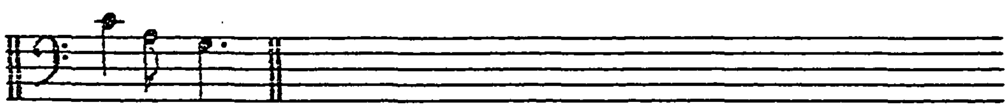

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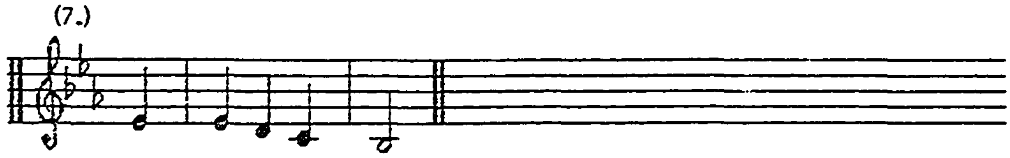

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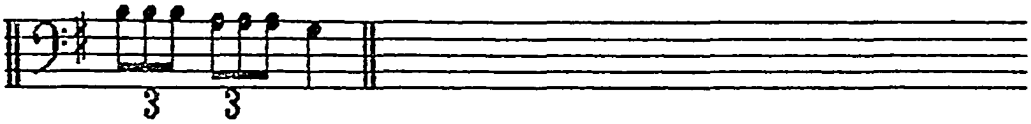

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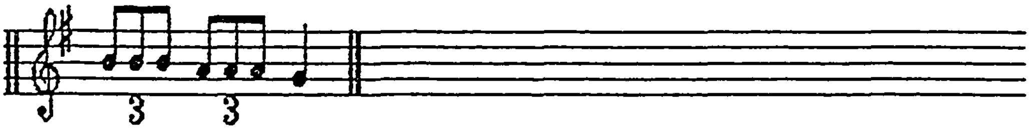

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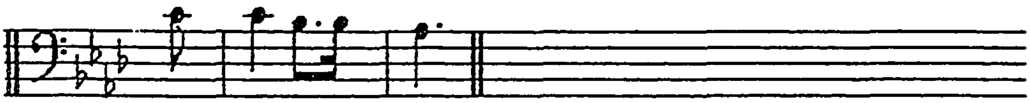

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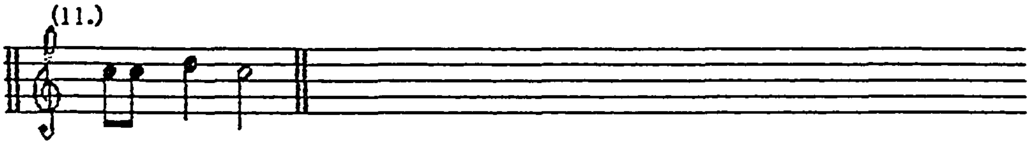

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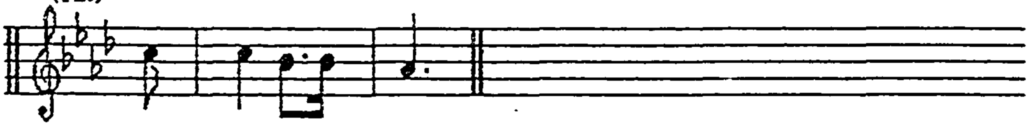

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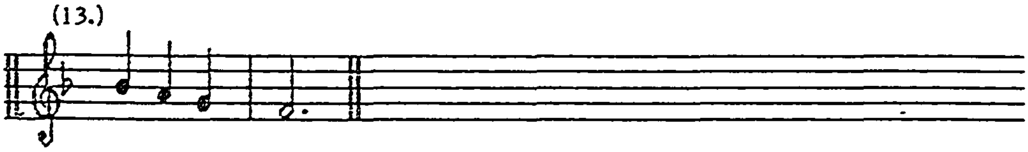

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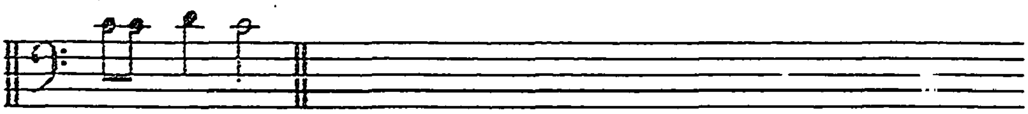

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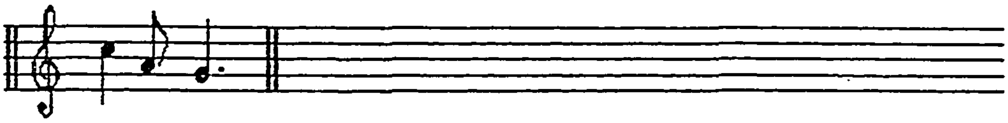

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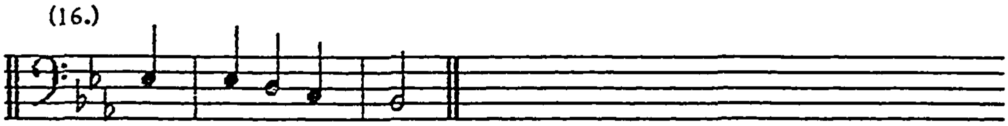

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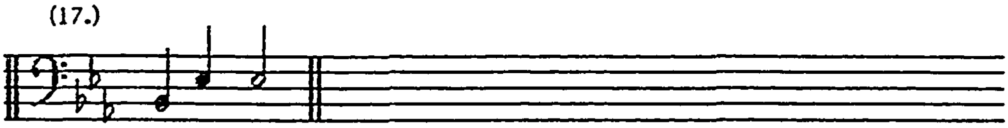

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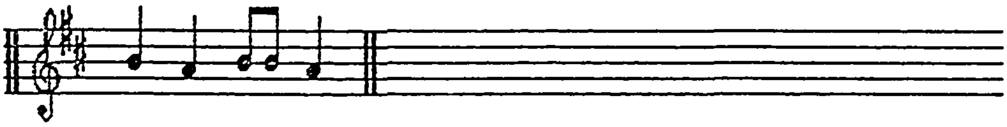

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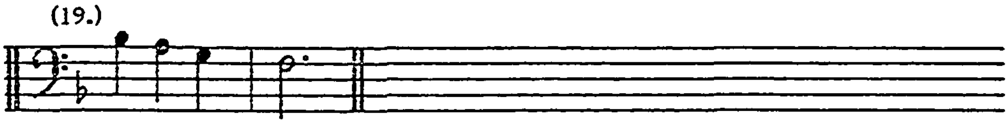

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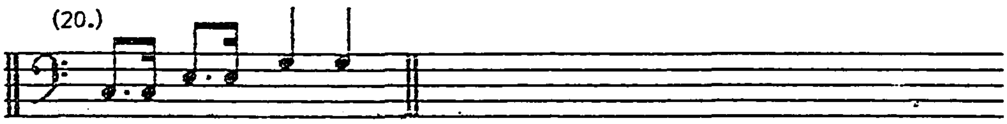
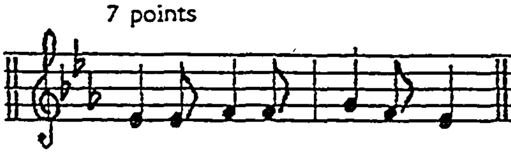


APPENDIX I

ILLUSTRATION OF SCORING PROCEDURE

Boardman Test Scoring System

7 points

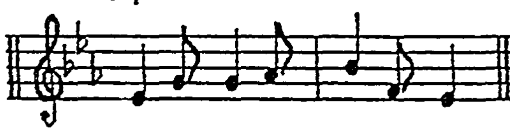


6 points

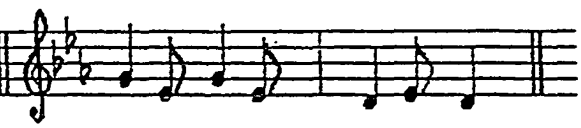
5 points

4 points

3 points



2 points



1 point for a spoken response or no response

APPENDIX J

EXAMPLE OF TRANSCRIBED RESPONSES AND SCORING

No. 1 Pretest Posttest E1 E2

Stimulus Response F: 50 N: 49

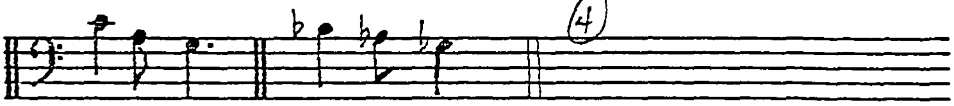
(1.)

(2.)

(3.)

(4.)

(5.)



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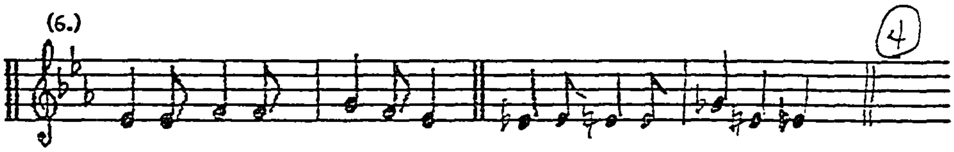

(7.)

(8.)

(9.)

(10.)

(11.)

(12.)

(13.)

(14.)

(15.)

(16.)

(17.)

(18.)

(19.)

(20.)

APPENDIX K

STUDENTS' SCORES

SUBJECTS' SCORES

Ss #	CLASS	F1	F2	GAIN	N1	N2	GAIN
1	E1	43	47	4	40	43	3
2	E1	47	57	10	41	47	6
3	E1	40	45	5	40	40	0
4	E1	39	49	10	35	42	7
5	E1	53	52	-1	40	45	5
6	E1	40	62	22	37	48	11
7	E1	52	70	18	46	48	2
8	E1	62	70	8	48	63	15
9	E1	62	68	6	43	51	8
10	E1	59	61	2	39	40	1
11	E1	42	53	11	37	38	1
12	E1	42	56	14	38	46	8
13	E1	46	49	3	47	45	-2
14	E1	21	23	2	23	24	1
15	E1	51	70	19	50	45	-5
16	E1	44	46	2	47	50	3
17	E1	55	65	10	46	46	0
18	E1	67	70	3	63	52	-11
19	E1	44	57	13	46	45	-1
20	E1	36	43	7	35	40	5

F1 - Pretest Falsetto Patterns
F2 - Posttest Falsetto Patterns
N1 - Pretest Normal Range Patterns
N2 - Posttest Normal Range Patterns

SUBJECTS' SCORES

Ss #	CLASS	F1	F2	GAIN	N1	N2	GAIN
1	E2	50	64	14	49	59	10
2	E2	44	68	24	46	54	8
3	E2	46	52	6	50	57	7
4	E2	52	63	11	54	66	12
5	E2	63	54	-9	49	49	0
6	E2	26	33	7	27	33	6
7	E2	59	60	1	49	50	1
8	E2	38	43	5	38	40	2
9	E2	41	50	9	40	45	5
10	E2	34	36	2	35	36	1
11	E2	43	62	19	45	48	3
12	E2	52	57	5	47	44	-3
13	E2	53	62	9	44	51	7
14	E2	30	37	7	28	41	13
15	E2	39	43	4	37	33	-4
16	E2	40	38	-2	36	39	3
17	E2	35	38	3	34	34	0
18	E2	35	61	26	33	53	20
19	E2	55	56	1	41	57	16
20	E2	39	55	16	36	41	5

F1 - Pretest Falsetto Patterns
F2 - Posttest Falsetto Patterns
N1 - Pretest Normal Range Patterns
N2 - Posttest Normal Range Patterns