The Male Falsetto Voice and the Lower Adult Male Voice: The Effects of Modeling on Children’s Vocal Accuracy

J. Andrew Hendley
Diane Cummings Persellin
Trinity University

When vocally modeling for students, male elementary music educators are faced with the dilemma concerning which register to use. The lower adult male voice is usually more comfortable, more natural, and easier for the teacher to sing. If the teacher sings in this lower voice, however, students must match pitch an octave higher and in a different timbre than what is heard, a potentially difficult skill for children.

Conversely, modeling an octave higher in the falsetto voice eliminates the need for children to transpose what is modeled to an octave higher in order to match that pitch. Children can imitate the teacher in the same register.

Singing in the higher falsetto register, however, has disadvantages. It may be unfamiliar or uncomfortable to male educators who would prefer to sing in their lower, more natural voice. When children hear their teacher modeling in the falsetto register, they may perceive that their teacher is singing in the top end of his range so they may try to do so as well. This may result in children singing an octave higher than desired. In addition, the timbre of the falsetto voice may be difficult for children to match with their voices. The unfamiliarity of using falsetto can often be overcome with practice on the part of the male music educator. It is unclear, however, whether children find the falsetto range and timbre helpful or confusing.

In this study the term “falsetto” refers to singing an octave higher than the lower, natural male voice. The vocal literature defines falsetto as a “false” voice, in that it is a product of strained vocal technique. This is in contrast to “upper voice” or “head voice” which is fuller and freer than the falsetto sound (Phillips, 1992; Vennard, 1967). Typically the falsetto voice has less vibrato than either the head voice or the lower male adult voice. While the literature makes a distinction between head voice and falsetto voice when describing vocal technique, the literature makes less distinction between the two when discussing modeling (Goetze, 1990; Nye, Nye, Martin, & Van Rysselbergh, 1992; Phillips, 1992; Swears, 1985; Vennard, 1967). Thus, the term “falsetto” will be used throughout this study.

While few music education texts discuss the topic of modeling and pitch-matching in classrooms led by male music educators, several do make recommendations. Anderson and Lawrence (1991) have advocated that male music teachers should use melody instruments as an aid in leading and teaching songs. No mention of singing with either the lower adult male voice or falsetto voice was made. Nye, Nye, Martin, and Van Rysselbergh (1992) stated that
occasionally, when children are confused by the sound of the male teacher’s lower voice, the teacher should “play the song on an instrument that gives proper pitch, have a child who knows the song sing it, or sing falsetto.”

Roe (1983) has cautioned that the timbre of the vocal model is a factor in pitch-matching and may confuse inexperienced singers. A child may attempt to reproduce the timbre of the model voice rather than the actual pitch, which could affect the child’s resulting pitch accuracy.

Phillips (1992) has recommended that male teachers who work with young children develop the ability to sing an octave higher than normal so as not to confuse pitch perception. He stated that this male falsetto modeling becomes less necessary as children become more confident singers. Swears (1985) agrees and has stated that the use of a light falsetto is most desirable when adult males provide vocal modeling for children.

Research has compared the effects of several types of modeling on pitch accuracy with children. Zwissler (1971) used a variety of models including a recorder, piano, xylophone, female voice, male voice, and others. She found that first graders matched pitch significantly better in their own range without an octave transposition. Rosenborough, Troncoso, and Piper (1972) also used a variety of models for their pitch-matching study. They stated that a female vocal model created more accurate results than the male voice or other instruments needing octave transposition. Clegg (1966) and Petzold (1966) found that children demonstrated significantly better pitch-matching responses to a female vocal model in their own octave, as opposed to a model sounding above the pitch with a flute or below the pitch with a lower male adult voice. Tatem (1990) concurred, stating that kindergarten through third-grade children responded most accurately when a soprano voice served as the model. In addition, children responded least accurately in this study when the stimulus was played on resonator bells, $p < .001$.

Hermanson (1972) tested 103 kindergartners and third-graders using four pre-recorded pitch sources: a child’s voice, a female voice, a piano, and an oscillator. While the subjects had the least amount of success with the piano as a model, they achieved the greatest success matching pitch with the female vocal model. They did not sing in tune significantly better with another child’s voice than with other timbres.

In contrast, Green (1987) found that elementary children from first through sixth grades matched pitch most accurately with a child’s vocal model. The female model was rated second. The lower adult male voice was the least effective of the three models tested. Although the falsetto voice did not serve as a vocal model in her study, Green recommended that further research be conducted in the area of male vocal modeling in order to establish guidelines for male teachers in the elementary music classroom.

In a study involving children from kindergarten through third as well as seventh and eighth grades, Yarbrough, Benson, & Bowers (1991) examined the effects of male and female vocal models, modes of responding, and grade levels on pitch-matching accuracy. While the male falsetto voice was not used as a model, their results suggested that children sang more accurately with the female vocal model than with the male vocal model, $p < .05$. A significant correlation between grade level and type of model was observed with seventh graders proving to be highly accurate in matching the female model and highly inaccurate in matching the male model.

Sims, Moore, and Kuhn (1982) also found a significant difference between a female vocal model and a male vocal model when testing five and six-year-olds both from the United States and the United Kingdom. They did not, however, advocate a male falsetto vocal model, but rather, pitched instruments or a child’s voice.

Wolff (1984) found a significant difference in pitch-matching ability in fourth graders when presented with a falsetto male voice versus the lower natural male voice. She stated that male
elementary music teachers would find their falsetto voice the most practical voice model for elementary children.

In a study (Montgomery, 1988) involving two third-grade classes, one with a falsetto voice as a model and the other with a lower adult male voice as the model, the twelve-week instruction period did not significantly improve vocal accuracy. Subjects did respond, however, with greater accuracy to test patterns modeled in falsetto rather than in the lower adult male voice. Kramer (1985/1986) found the falsetto voice to be efficacious in a study in which two vocal test were administered to third- and fourth-grade children. The number of inaccurate singers decreased from 51% on the first test with the lower adult male model voice to 30% on the second test with the male falsetto model. Kramer suggested that these children found the lower adult male voice confusing when matching pitch.

Killian (1985) did not find this to be the case. Results from her study indicated that the octave in which the vocal model was presented by a female made no significant difference in pitch matching accuracy to 60 seventh and eighth graders. She stated that this would tend to indicate that educators could model examples in whichever octave is most comfortable for the teacher. She recommended further research examining the effect of male voice models on pitch accuracy.

Small and McCachern (1983) found no significant difference in the accuracy of pitch-matching ability when first graders received modeling from male teachers using the lower octave or by female teachers. Students who could match pitch with one model could generally match pitch with the other model.

In their survey of recent research on children’s singing, Goetze, Cooper, and Brown (1990) suggested that male teachers consider using falsetto to provide initial pitches for singing. They did not advocate that male teachers provide a vocal model by singing in falsetto, but, instead, recommended that recorded songs and patterns with a female model be used for introducing songs or asking a child to be the model singer for the class.

The conflicting literature, as well as the effect of the age of the subjects, provided the impetus for this study. The purpose of this study was to determine whether the falsetto voice or the lower adult male voice was more effective on pitch-matching accuracy of first-, third-, and fifth-grade children after an eight-week treatment period. It was also to be determined whether this treatment would alter the children’s ability to match pitch with a female vocal model.

Method

The subjects for our investigation were 152 children from an urban middle class elementary school in south Texas. Two classes each of first, third, and fifth graders were involved in the study. These six classes met twice each week for 25 minutes per day.

Prior to the eight-week treatment all students were assessed regarding their pitch-matching ability. This Initial Vocal Assessment (IVA) was conducted by the children’s female music teacher the second week of school before the children had had the opportunity to sing together. Most children were familiar with the female music educator at that school so were comfortable singing for her in class. The male music investigator was a student teaching intern in the school for 10 weeks and was comfortable singing in both his falsetto and his lower tenor voice. The male investigator who provided the vocal model in this study has little vibrato in either his falsetto or his lower male voice so differences in timbre between the two voices were not considered to be a major factor in the study.

The IVA was conducted during the regular music classes to assure that children were in comfortable surroundings with their peers. The children were familiar with the assessment procedure which had been introduced as a pitch-matching game the previous week. The children were seated in a circle with the teacher shielding the microphone from view. She sang a two-
tone musical question to each child who, in turn, responded on the same two tones. No verbal feedback was given to the children regarding the accuracy of their responses during the assessment procedure.

Children’s vocal responses to the assessment were tape recorded for later analysis. The children’s responses were then judged to be accurate or inaccurate. If the pitch of the response was considered to be more than a quarter step flat or sharp it was judged to be inaccurate. The children’s responses were analyzed independently and interjudge reliability was deemed satisfactory ($r = 0.91$).

As determined by random assignment, three classes heard all modeling by the male investigator in his lower adult male voice. These classes will subsequently be referred to as the tenor classes. The other three classes, the falsetto classes, received the same instruction from the same investigator, but using only his falsetto voice when modeling. Only one voice type as a model was used in each class. During the treatment period, children sang in every class. The male investigator modeled the songs and taught in either the tenor voice for three of the classes, or the falsetto voice for the other three classes.

During the treatment phase of the study, verbal feedback was given to the class regarding their unison singing with the male music educator. Children were encouraged to listen carefully to the vocal model, to sing in their light, high voices, and were praised when the class performed well.

Following the eight-week treatment, children were tested by the male investigator to ascertain if the tenor or the falsetto voice contributed to better pitch-matching. The same method was followed as for the IVA with the exception that the tenor voice was used as the model with the tenor classes and the falsetto voice was used as the model with the falsetto classes.

As a corollary to this experimental study, a questionnaire was sent to 15 male elementary music educators. These educators were selected because they were considered to be from suburban elementary schools of similar socio-economic background. The purpose of the questionnaire was to determine current attitudes and practices involving the use of the falsetto voice and the lower male singing voice in the elementary music classroom. Questions also dealt with the use of other instruments as models for children’s singing.

Results

The study was designed to determine whether children sing more accurately with a falsetto model or with the lower male voice model. One-hundred forty-two children ($N = 142$) completed the IVA and FVA administered by the female music educator; the children also completed one of the tests administered by the male researcher who modeled in either his tenor voice ($n = 74$) or his falsetto voice ($n = 68$).

Falsetto Modeling

The IVA was administered by the female music educator the second week of school before children had had the opportunity to sing together as a class. The percentage of children from the falsetto classes who successfully matched pitch in this assessment were: 25% of the first graders, 8% of the third graders, and 14% of the fifth graders.
Following the eight weeks of singing with the falsetto model, children in the three falsetto classes were tested to determine their ability to successfully match pitch. Thirty percent of the first graders, 23% of the third graders, and 54% of the fifth graders were successful at matching pitch with the falsetto model. The third and fifth graders increased their vocal accuracy significantly with the falsetto model while the first graders improved only slightly.

The falsetto voice did not appear to confuse children. Comparing the combined falsetto test scores to the combined FVA scores administered by the female music educator, there was no statistically significant difference (Figure 1). When these combined scores from the eight-week instruction in falsetto were compared to the combined scores from the initial assessment, the falsetto scores were significantly higher, \( p < .02 \). The difference was most evident at the fifth-grade level, \( p < .01 \).

The difference between pitch-matching after eight weeks of hearing the tenor voice model versus hearing the falsetto model was highly significant. A chi-square analysis of the results revealed that children in each of the three classes given falsetto modeling appeared to be more successful than children receiving tenor instruction (Figure 2). The differences were statistically significant at the \( p < .01 \) level for fifth graders. These results were obtained comparing appropriate male vocal tests at each grade level. Combining children from all three grades who received instruction with the falsetto model grades, the difference was significant at the \( p < .01 \) level.

**Tenor Modeling**

The IVA was also administered to children in the tenor classes before the treatment began. The percentage of children in the tenor classes successfully matching pitch in the IVA was 21% of the first graders, 19% of the third graders, and 41% of the fifth graders.

Children who received the eight weeks of tenor modeling were tested by the male investigator using his tenor voice following the treatment. Four percent of the first graders, 4% of the third graders and 12% of the fifth graders matched pitch successfully with the tenor model following the eight weeks of tenor treatment. All three of these classes sang significantly less accurately after the treatment when tested by the tenor model than they had sung before the treatment on the IVA with the female soprano model.

What was most surprising was the effect of tenor modeling (Figures 1 and 2). A chi-square analysis of results obtained from all seventy-four children following the treatment who heard the tenor model (\( n = 74 \)) revealed that pitch-matching accuracy was significantly greater (\( p < .01 \)) when children echoed the singing of the female teacher than when they echoed the male teacher using his tenor voice. Examination of responses at each grade level revealed that the scores of first and third graders were statistically significant, \( p < .02 \). Results of the scores of fifth graders were not significantly different.

Therefore, our findings indicate that these first, third, and fifth graders found it more difficult to accurately echo the tenor voice after receiving eight weeks of tenor vocal modeling. Tenor modeling not only failed to improve vocal accuracy, it appeared to hinder it. The modest success on the initial assessment was no longer apparent following eight weeks of tenor instruction (Figure 2). Vocal accuracy at each grade level was less than noted prior to teaching (\( p < .01 \)).
Figure 1. Comparison of combined scores of all three grade levels from the Initial Vocal Assessment (IVA), Falsetto Test, Tenor Test, and Final Vocal Assessment (FVA).

Figure 2. Test results following the tenor and falsetto treatments at all three grade levels.
Results from the questionnaire returned by 8 of 15 male elementary teachers reflected a diversity of opinions and uses of the falsetto voice as a model. All indicated that they had sung in falsetto in their classes but the percentage of time varied from 5% to 95% of the total time spent in singing. When asked if falsetto modeling facilitates pitch-matching for children, four teachers said yes and four were either negative or inconclusive. Two educators indicated they had experienced problems with children matching pitch too high with a falsetto model. When asked when the teachers used their falsetto voice, answers varied. Four used the falsetto voice when presenting new music. Five teachers said they sing the starting pitch in falsetto and then sing the song in their lower adult male voice. Results were evenly divided when asked if students find it more difficult to match pitch with a lower voice. Most of the teachers indicated that they have used instruments such as the piano, recorder, or glockenspiel to model the melody in the correct octave.

Discussion

Results from this study indicate that falsetto modeling did not appear to hinder the pitch-matching accuracy of these students after an eight-week testing period. In fact, vocal accuracy improved significantly with falsetto treatment. While some of the younger children initially attempted to sing an octave higher in order to also sing in the upper end of their voice ranges, this became less of a problem by the end the eight-week treatment period.

In contrast to our findings on falsetto modeling, tenor modeling appeared to hinder pitch-matching accuracy with the younger and more inexperienced singers, the first and third graders. During the treatment period, the male vocal model found that in classes in which the tenor voice was used, students could not easily match pitch; therefore, unison classroom singing appeared to be poor. Children had to be continuously encouraged to listen carefully and to try to sing in the correct range.

The older and more experienced fifth-grade singers were somewhat more successful at pitch-matching with the tenor model than were the younger children. It is not known whether the younger children would have adapted to a tenor model and eventually found it easier to match pitch in their own ranges if the experiment had been extended. After eight weeks, however, the younger children continued to find it more challenging to match the tenor model than the falsetto or, subsequently, the female soprano model.

Our results concur with the findings of Green (1990), Rosenborough et al., (1972), Sims et al., (1982), and Wolf (1984). They, too, stated that the lower adult male vocal model is less successful as a pitch-matching model for children than a model presented in the children’s own ranges. The results of our study also support Kramer’s research (1985/1986) in which the falsetto voice was found to provide a more successful model for vocal pitch-matching than the lower adult male voice model.

Findings from a sampling of adult male music educators revealed a wide range of opinions and comfort levels regarding the use of falsetto as a model for their students. While these educators felt that falsetto modeling could be valuable, they were inconsistent in their use of it with students.

In summary, the falsetto model was used successfully with these children, whereas the tenor voice appeared to confuse them. While some male music educators may be reluctant to sing in falsetto, it is suggested that our results, together with the studies listed above, may encourage them to use this valuable tool in their classrooms.
References


