The Effect of Writing Solfège Syllables into Choral Repertoire on the Sight-Reading Ability of High School Choir Students

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Background

Sight-reading is widely considered one of the most important parts of a choral music education and plays an important role in developing independent music learners (Collins, 1993) and a good indicator of music achievement (Hayward & Gromko, 2009). It has also been said that better sight-readers tend to be better performers (Lehman & McArthur, 2002). Additionally, sight-reading is one of the core skills mentioned in the National Association for Music Education's Core Music Standards (NAFME, 2015). In many states, sight-reading is a required portion of choral contest participation and all-state choir auditions. A variety of opinions exist, however, as to the best method of teaching sight-reading in the choral classroom.

An array of systems are being used in the United States to develop sight-reading skills (McClung, 2001). The most commonly used melodic pitch systems include interval names, letter names, fixed-do, scale-degree numbers, and moveable-do. Most research regarding the best teaching method has been found to be inconclusive; however, Demorest and May (1995) found that singers using moveable-do solfège achieved significantly higher scores in sight-reading than those using fixed-do syllables.

Many educators have long believed that a focus on targeted pitch instruction will improve sight-reading skills. Henry (2004) found a significant increase in sight-reading ability after a 12-week period of targeted pitch instruction. Studies have also been conducted on the use of harmonic accompaniment with vocal sight-reading. Boyle and Lucas (1990) found sight-reading scores were significantly higher when the sight-reading performance included a harmonic accompaniment.

Does the rhythmic difficulty of literature affect the quality of one's sight-reading ability? Educators have experimented with removing rhythm from sight-reading exercises to improve

pitch accuracy. Henry (2011) found that pitch accuracy of a passage that was sight-read was not affected by the presence of rhythm tasks, even when the tasks were of varying levels of difficulty.

According to Henry (2001), teachers lack time and resources for regular sight-reading assessment. Daniels (1986) found sight-reading ability was not directly related to curriculum and had more to do with attitude of the choir director toward the skill. If the director found sight-reading important, then the students sight-read at higher levels. This correlates with Demorest's (1998) study that found individual testing to be a useful technique in aiding sight-reading skills.

Studies in neuroscience have led us to an understanding that music experiences are processed in several areas of the brain (Hayward & Gromko, 2009). Research has also been conducted on visual, spatial, and kinesthetic learning tools when teaching sight-reading. Hutton (1953) said the use of visual materials simplifies the learning process and diminishes the effort required to understand abstractions. When using Kodály-inspired instruction, solfège syllables are often printed spatially on unlined paper or within note heads on staff paper.

The use of moveable syllables, reinforced kinesthetically with hand signs, is another commonly researched method. Killian and Henry (2005) found that students performed with higher accuracy while sight-reading individually when using hand signs. Cassidy (1993) and McClung (2008) found the opposite result; the effects of using Curwen hand signs showed no significant difference. The use of shape-note notation was another tool found to be useful in music reading (Kyme, 1960). In contrast, Martin (1991) found placing the note heads or letter representations of syllables at varying heights on cards did not improve student sight-reading performance.

Hutton (1953) completed a comparative study of the use of audio-visual materials in sight-reading instruction. She found the students who learned with the aid of flash cards, musical games, and slides scored significantly higher than the students who received no visual aids during instruction.

Rogers (1991) tested the use of color-coded notation on 5th and 6th grade beginning

instrumental players' sight-reading ability. The results showed no clear advantage for the experimental group who had been taught to read with the color-coded notation over the control group that was instructed with normal un-colored notation. However, the students in the experimental group seemed to be dependent on the color-coded notation, scoring the lowest scores when reading regular black and white notation. Rogers (1996) found instruction involving the addition of color to standard rhythmic notation positively affected the performance of students on the tasks of vocalizing and clapping rhythms at sight.

Research conducted in music education has shown that sight-reading is improved through teaching approaches that integrate auditory, visual, and kinesthetic processing (Hayward & Gromko, 2009). A tool many choral directors use is writing solfège syllables into the music score. Many choral music educators believe the action of writing is used to reinforce the ability to pair each note to its solfège syllable. It is also common to have the students write the solfège syllables next to the note to try to reinforce the spatial positioning of the notes on the staff. This practice attempts to combine auditory, visual, and kinesthetic skills.

The purpose of this study was to determine the effectiveness of writing solfège syllables into music. Research questions were as follows: (1) Is the combination of auditory, visual, and kinesthetic skills (writing solfège) improving sight-reading ability or are singers becoming dependent on reading the written syllable? (2) Is audiation, an aural technique, a better choice for high school choir students? (3) Do the number of years in choir or the gender of the participant affect results?

Method

Two sight-reading melodies were created based on exercises from "Week 13" in McGill and Stevens' *90 Days to Sight Reading Success* (2003). Each melody was in the key of F-major and was four measures in length. Effort was made to make each melody of similar difficulty by using the same number of rhythmic changes and the same interval leaps (see Figure 1). A pilot study was completed to determine the appropriate difficulty level for the melodies.

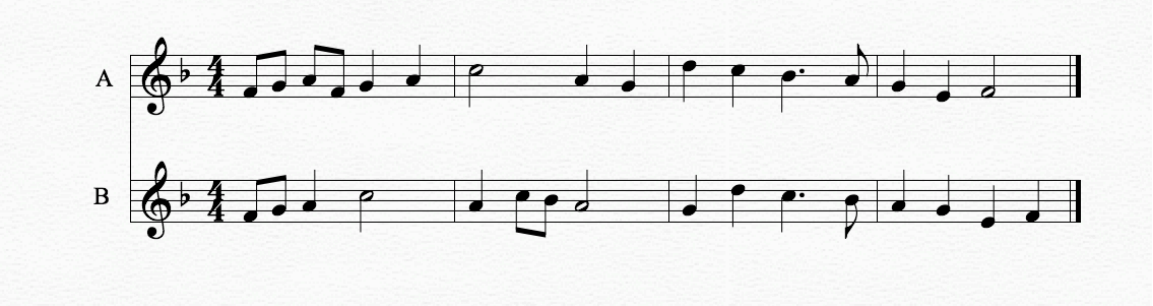

Figure 1. Pre-test and post-test melodies.

Students (N = 98) in a choral program from a 4A high school in central Texas participated in the study. Each participant was given a written survey inquiring about instrumental background, gender, participation in private voice lessons, and number of years in choir. They were then randomly assigned to two different study groups. An independent t-test using pre-test results revealed no significant difference between the groups, $t(96) = .75$, $p < .05$.

Participants were given a pre-test to determine their sight-reading level before the experiment began. The students were randomly assigned to sight-read Melody A or Melody B. Half of the participants in each group did the pre-test with Melody A and the other half with Melody B. The students were allowed 30 seconds to chant through the melody. At the end of the chant period, the tonic triad was played and the participant was instructed to sing the melody. Each pre-test was recorded and scored from the recording. Participants received a point for every correctly sung pitch with a maximum score of 16. An independent listener analyzed 25% of the recordings randomly selected from each group on pre-test and post-test trials. Reliability, calculated using Pearson's r, was 99%.

After pre-tests were completed, both groups were taught a five-minute sight-reading lesson three days a week for six weeks. Each lesson contained a melody from the *90 Days to Sight Reading Success* book starting in "Week 8" and progressed each week until the sixth and final week of the study correlated with "Week 13" in the book.

Group A (n = 49) was given a new melody for each lesson and given one minute to write

solfège syllables on their paper. Half of the group wrote syllables next to the note head and the other half wrote syllables under the staff. The participants then chanted through the melody twice before tonicizing the key and singing the melody twice.

Group B (n = 49) was given a new melody for each lesson (the same melody as group A) and was asked to chant through it twice on solfège syllables. The tonic triad was then played and they were given one minute to audiate the melody individually. During audiation, participants were instructed to hear the melody in their head while mouthing solfège syllables and using Curwen hand-signs. At the end of the minute, the tonic triad was given a second time and the melody was sung twice.

At the end of the six weeks of instruction every participant was given a post-test. The melodies used for the pre-test were re-used and participants were tested on the opposite melody from their original test. If a participant did the pre-test with Melody A then the post test was completed with Melody B. The students were allowed 30 seconds to chant through the melody. At the end of the chant period, the tonic triad was played and the participant was instructed to sing the melody. Each test was recorded and scored from the recording. Each participant received a point for each correctly sung pitch with a maximum score of 16.

Results

Matched-pairs t-tests were used to compare pre-test and post-test scores among the study groups. Comparison of the pre-test and post-test scores for all study participants revealed a significant difference, $t(97) = 8.37$, $p < .001$. Comparison of the pre-test and post-test scores for Group A (written) revealed a significant difference, $t(48) = 5.15$, $p < .001$. Comparison of the pre-test and post-test scores for Group B (audiation) revealed a significant difference, $t(48) = 6.7$, $p < .001$. (See Table 1 for means and standard deviations by group.) Both groups showed improvement.

Table 1. Means and standard deviations of pre-test and post-test scores.

	Group A (Written)	Group B (Audiation)
Pre-test Mean Score (Standard Deviation)	6.69 (5.13)	5.96 (5.25)
Post-Test Mean Score (Standard Deviation)	10.14 (5.19)	10.41 (5.04)

An independent t-test was run to compare the difference scores between Groups A and B. This test revealed no significant difference, $t(96) = 1.06$, $p = .292$, between the groups (see Figure 2).

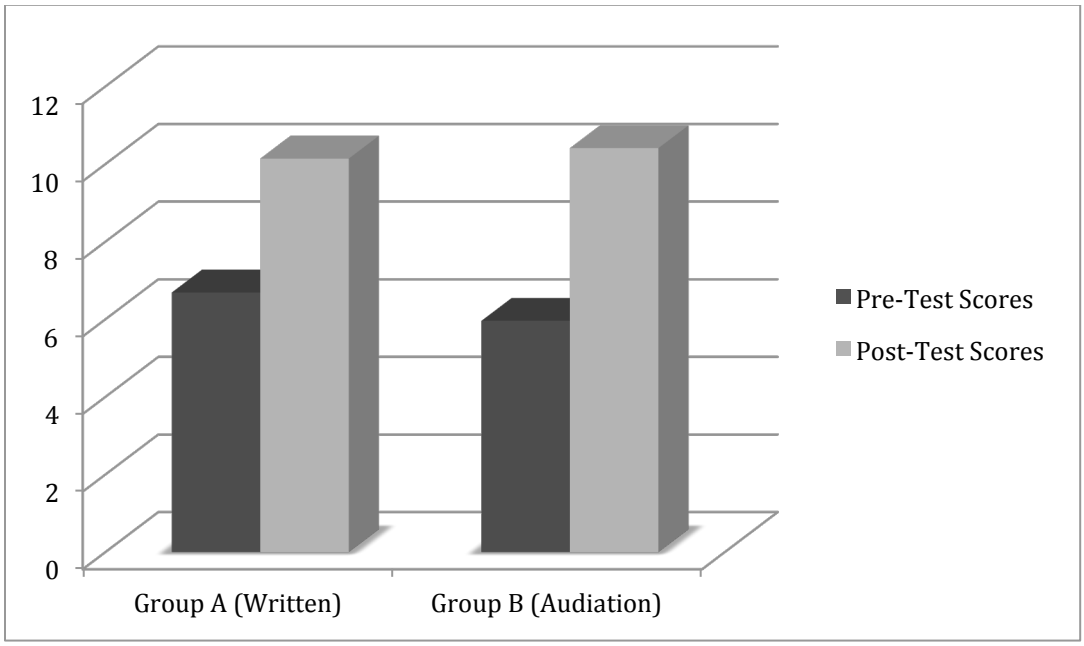

Figure 2. Comparison of mean pre-test and post-test scores.

One-way analyses of variance (ANOVAs) were used to compare post-test scores between genders. There was no significant difference between scores of males and females [$F(1, 96) = .53$, $p = .468$].

One-way ANOVAs were used to compare post-test scores to the number of years the participants had been in choir. The test revealed a significant difference in the scores [$F(2, 95) =$

7.28, $p < .05$]. A post hoc Tukey-Kramer Test found the significance lay between those with less than three and those with more than six years of choir experience, $p < .05$ (see Figure 3).

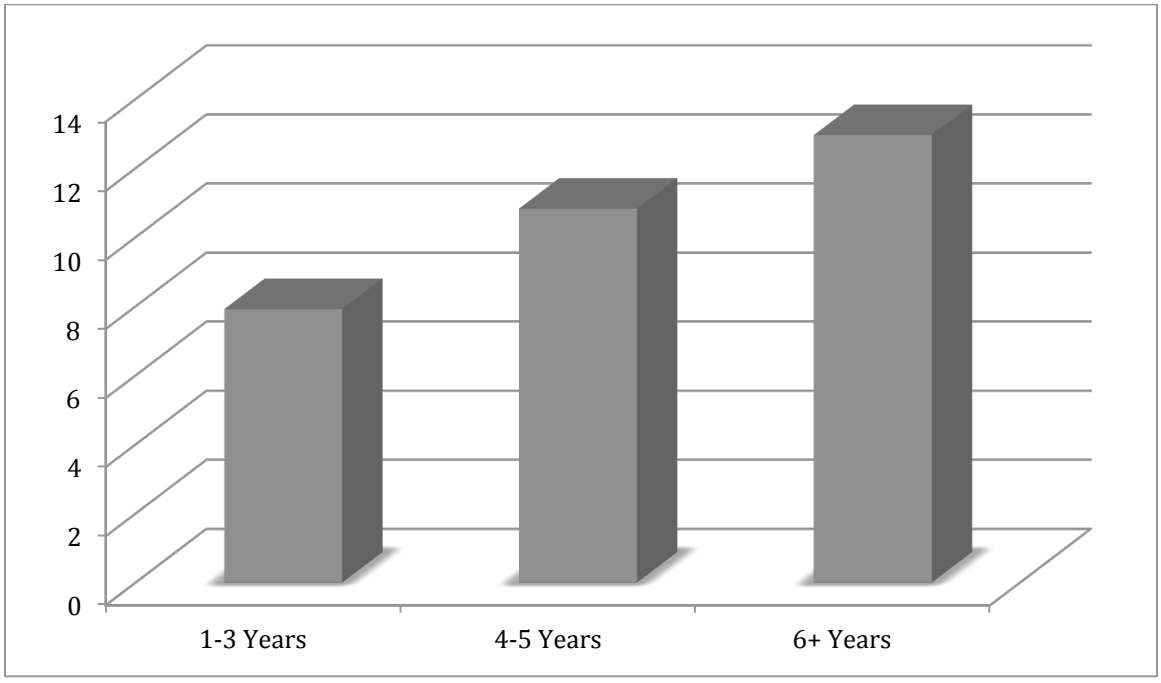

Figure 3. Mean post-test scores grouped by number of years of participation in choir.

Discussion

The first two questions in this study were, "Will the combination of auditory, visual, and kinesthetic skills improve sight-reading ability or will it cause singers to become dependent on reading the written syllable?" and, "Is audiation a better choice for high school choir students?" After comparison, both study groups made significant improvement from pre-test to post-test. Upon studying the difference in score results, neither group had a more dramatic change in score from pre-test to post-test. This shows the act of practicing sight-reading in class, using either method, will help students improve the skill. However, this does not correlate with Killian and Henry's research (2005) that showed daily rehearsal as not significant to individual sight-reading test results.

Gender made no significant difference in scores. On the contrary, the scores comparing the

number of years in choir were significantly different. Participants with more than six years in choir scored significantly higher on the post-test than those with less than three years experience. These results are interesting because Killian and Henry (2005) found that less experienced singers were not necessarily in the low-performing group.

In study Group A, half the participants were instructed to write the solfège syllable under the staff and the other half next to the note. Since my sample sizes were small, I did not make this a research question. However, it is worth noting that the group that wrote next to the note head performed better on the post-test than the participants that wrote under the staff. Even though both groups were able to look at the written syllable, research seemed to indicate the act of writing next to the note and reading next to the note was more valuable than just looking under the staff. Future research efforts should be conducted to continue to explore this relationship.

The results of this study are potentially highly applicable in the choral classroom. If students are writing solfège on the score or just audiating pitches in their head, the use of either of these sight-reading methods could improve sight-reading ability.

Keywords

sight-reading, singing, audiation, solfège, choir

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