

Sight-Singing Scores of High School Choristers with Extensive Training in Movable Solfège Syllables and Curwen Hand Signs

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Randomly chosen high school choristers with extensive training in solfège syllables and Curwen hand signs ($N = 38$) are asked to sight-sing two melodies, one while using Curwen hand signs and the other without. Out of a perfect score of 16, the mean score with hand signs was 10.37 ($SD = 4.23$), and without hand signs, 10.84 ($SD = 3.96$). A repeated-measures ANOVA revealed no statistically significant difference, $F(1, 37) = .573$, $p = .454$. These findings support the results of five earlier studies; however, because earlier studies were limited to students who were minimally trained in movable solfège syllables and Curwen hand signs, this study expands the knowledge base. Relationships between performance scores and instrumental experience, class grade, sight-singing experience, and hand sign experience were also examined. A pedagogical strategy for linking Curwen hand signs with students' preferred modes of learning (especially the kinesthetic mode) is recommended.

Keywords: *sight-singing; Curwen hand signs; pedagogy; music literacy; choral music classroom*

Music literacy is a primary instructional goal in the music classroom (cf. the National Standards for Music Education; MENC, 1994). Sight-singing, a specialized component of music literacy, is a skill that remains a challenge to many young musicians. Research has shown that the two relative solmization systems, movable solfège syllables (movable *do*) and movable pitch numbers (scale degree numbers), are the two dominate pitch systems used to sight-sing in American classrooms (Demorest, 2001; Johnson, 1987; May, 1993; McClung, 2001; Pembroke & Riggins, 1990; Smith, 1998).

The use of movable solfège syllables, reinforced kinesthetically with hand signs, is a core element of the music reading system attributed to Hungarian Zoltan Kodály

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(1882-1967; Choksy, 1974). In practice, Kodály incorporated the work of many music educators into his amalgamated, eclectic approach to music education (Zemke, 1977), including the hand signs developed by Englishman John Curwen (1816-1880; Rainbow, 1979). Integrated into many North American public schools in the 1960s, the Kodály approach to music education has influenced vocal music education generally and the development of music reading skills specifically (Sumner, 1998).

In the relative solmization (movable tonic pitch system) espoused by Kodály, students are taught to associate a specific scale degree with a specific solmization syllable and to connect that syllable with the specific shape and thoracic location of a hand sign. Teaching strategies used to achieve this objective require a variety of simultaneous responses from the student: (a) an aural response—to listen, audiate, identify, and label pitches with specific solfège syllables; (b) a visual response—to identify and connect specific solfège syllables to modeled hand shapes or notated pitches; (c) a kinesthetic response—to create the physical hand shapes for the various solfège syllables while using the same hand to relate the intervallic rise and fall of pitches to the appropriate thoracic region; and (d) an oral response—to match with the singing voice a specific pitch using a specific solfège syllable (McClung, 2008). How students process such information has been associated with individual learning styles, general learning (Dunn & Dunn, 1993; Wallace, 1995), and music-specific learning (Apfelstadt, 1986; Mason, 1991; Pautz, 1988; Persellin, 1988; Tiller, 1991).

Dunn and Dunn (1993) described learning styles as biological and developmental sets of personal characteristics that make the identical instruction effective for some students and ineffective for others. Learning style variables include each person's environmental, emotional, sociological, physiological, and cognitive processing preferences. Cognitive processing modalities include auditory (listening), visual (reading), tactile (physical manipulation of materials), and kinesthetic (whole body, physically direct involvement).

Studies have been designed to investigate the connection between cognitive learning styles and music learning. Apfelstadt (1986) determined that, when children learn pitch patterns, the kinesthetic and visual modalities could be used to reinforce the auditory. When Pautz (1988) examined the influence of matching instructional techniques to children identified as visual, auditory, kinesthetic, or mixed modality learners, results indicated a positive effect tendency but no significant differences. In 1991, Mason conducted a study using nine middle and junior high school instrumental programs. Results indicated no relationship between sensory mode preference (aural, visual, tactile, and kinesthetic) and music reading achievement. Tiller (1991) wanted to determine whether an individual's learning modality preference was consistent and stable or whether it would vary when moving from general to music-specific studies. Results indicated that individuals can have internal inconsistencies and that the learning style preference of some individuals can differ significantly when moving from nonmusical studies to musical studies.

The preferred cognitive learning style of music teachers and, as a consequence, how music teachers choose to teach, was the topic of a study by Persellin (1988).

The study assessed the learning and teaching modalities (visual, auditory, kinesthetic, and mixed) of 95 music educators. Results indicated that visual modality was the most preferred learning mode and that a majority of these visual learners preferred the visual mode for teaching. The smallest percentage, 3%, identified themselves as kinesthetic learners. In this group of kinesthetic learners, 70% preferred to teach using the kinesthetic mode. None of the kinesthetic teachers preferred the visual mode for teaching. Tapping into a student's kinesthetic learning mode is an important pedagogical feature to Curwen hand signs.

Curwen hand sign advocates believe that hand signs link a student's kinesthetic learning modality with the development of musical pitch acuity. To test this premise, music studies have been designed to explore the connection between the acquisition of acute musical pitch skills and the kinesthetic learning modality inherently found in Curwen hand signs.

Autry (1976), in one such study, included 14 experimental and control groups. Participants ($N = 263$) were students in four fifth-grade music classes and four college classes (two classes of music fundamentals and two classes of elementary music methods). All groups participated in sight-singing experiences as a part of their regular music class for a period of 10 to 14 weeks. The control groups used movable solfège syllables, and the experimental groups used solfège syllables coupled with Curwen hand signs. Posttest results indicated no significant differences between groups. Jones (1981) tested pitch discrimination skills of 94 seven-year-olds. Instruction was stretched over a 6-week period. Children in one group were instructed using physical involvement, including Curwen hand signs, while those in a second group used no movement. Results indicated no significant differences between groups on posttest scores of pitch discrimination.

First graders were the participants in Martin's (1991) study of the effects of three instructional methods on acquisition of tonal skills. Group I echoed tonal syllables, Group II echoed tonal syllables coupled with hand signs, and Group III echoed syllables and hand signs while viewing letter representation of the patterns on a card. Results indicated no significant differences attributable to instruction. The participants in Youngson and Persellin's (2001) research were first graders as well. Two classes received identical music instruction, except that one class was taught using the Curwen hand signs coupled with solfège syllables while the other's instruction was limited to solfège syllables only. Analyses revealed no significant differences between groups.

In Frederickson's (1993) study, eight intact classes of fourth-grade and fifth-grade students ($N = 136$) were divided into groups that used either solfège syllables coupled with Curwen hand signs, solfège syllables with no hand signs (the control), or floating their hands in an up or down motion to reflect the intervallic rise and fall of pitches pitch movement. All groups received two 20-min instruction sessions for a 14-week period. Posttest results indicated that participants using hand levels (relating the hand to the intervallic rise and fall of pitches) performed significantly better than the other two groups.

My search of the literature found only one study supporting the use of Curwen hand signs with statistically significant evidence. After 37 weeks of instruction, Steeves (1984) tested 47 fourth-grade students. One group had used Curwen hand signs coupled with solfège syllables, and the other group had used solfège syllables only. Posttest scores revealed that the hand sign group scored statistically higher than the no hand sign group.

A common factor in all of the studies described was the participants' short-term experience with movable solfège syllables coupled with Curwen hand signs. Although Killian and Henry (2005) reported the general use of Curwen hand signs by high school choristers during the testing of sight-singing skills, the effect of hand signs on the sight-singing scores of high school choristers extensively trained in the use of movable solfège syllables, coupled with Curwen hand signs, remained untested.

Purpose

The purpose of this study was to determine whether high school choristers who had received extensive training in sight-singing using movable solfège syllables coupled with Curwen hand signs produced higher sight-singing scores with or without the use of Curwen hand signs. This investigation included three formal research questions and one informal interview inquiry: (a) Is there a significant difference in sight-singing scores when high school choristers with extensive training in movable solfège syllables coupled with Curwen hand signs use Curwen hand signs and when they do not use Curwen hand signs? (b) Are there significant differences among the sight-singing scores with and without Curwen hand signs when considering instrumental experience? (c) What are the magnitudes of the relationships between sight-singing scores with and without Curwen hand signs and participants' class grade, years of sight-singing experience, and years of Curwen hand sign experience? (d) What are the students' perceived personal insights of coupling Curwen hand signs (a kinesthetic skill) with sight-singing skills?

Method

Based on superior sight-singing scores at regional large-group choral festivals and the classroom teachers' high level of confidence in the positive effect of Curwen hand signs on students' ability to sight-sing successfully, three moderately large high school choral programs (spread geographically across the northern Texas region) were invited to participate in this study. The population was composed of 130 choristers enrolled in three advanced mixed high school choirs. All choristers had extensive training in sight-singing skills that included the use of movable solfège syllables coupled with Curwen hand signs. For the purposes of this study, "extensive training" was defined as daily sight-singing instruction, wherein directors insisted that

choristers use hand signs coupled with solfège syllables when practicing pitch drills and for learning classroom repertoire. Study participants were selected using a simple random sample. At each school, the names of all advanced choir members were placed in a container, and from that container, each choir director chose 14 study participants. Of the 42 participants selected, 38 consented to participate in the study.

Sample participants included 20 females and 18 males; 13 sopranos, 7 altos, 8 tenors, and 10 basses. School grade levels represented included 11 sophomores, 14 juniors, and 13 seniors. For 26 participants, the mean number of years of instrumental study (piano and/or ensemble instrument) was 6.1, with a range of 1 to 8 years. The remaining 12 participants had no experience playing an instrument. The average number of years of sight-singing instruction was 4.1, with a range of 2 to 13 years. The average number of years of experience using Curwen hand signs in classroom sight-singing procedures was 3.9, ranging from 2 to 13 years.

A researcher-developed instrument, consisting of two melodic sight-singing test examples, was created for this study. To achieve appropriate, analogous levels of difficulty, the examples were constructed using specific limitations: (a) phrase length—eight measures in 4/4 time; (b) pitch—diatonic with *do*/1 as beginning and ending pitch; (c) pitch movement—stepwise and five leaps that included one minor 3rd, one perfect 4th, two major 6ths, and one minor 7th; (d) duration symbols—eighth notes, quarter notes, dotted quarter notes, half note, dotted half note, and whole note; and (e) keys—bass and alto in D and E \flat , tenor in F and E, soprano in F and E \flat . The test melodies are provided in Figure 1.

Figure 1
Sight-Singing Examples A and B

Example A

Soprano

S.

Alto and Bass Key = E: Tenor Key = E

Example B

Soprano

S.

Alto and Bass Key = D Tenor Key = F

A test room with piano was obtained at each high school. Prior to entering the test room, participants were provided a written description of the two testing procedures (Sequence A and Sequence B). The overview of testing procedures was provided including instructions related to (a) length and meter of each example (8 measures and 4/4 time); (b) preparation elements provided from piano (the *do*, the tonic triad, plus a 60-beat-per-minute tempo); (c) preparation time (30 sec); preparation time expectation (Sequence A with hand signs and Sequence B without hand signs); (d) preparation time after 30 sec (reestablish *do*, the tonic triad, plus a 60-beat-per-minute tempo); (e) presentation instructions (participant sets one measure of tempo and sings—Sequence A, with hand signs and Sequence B, without hand signs); (f) allowances (within the first two measures, one false start allowed without deduction; each additional false start would earn 2 deduction points). Throughout the testing process, no points were earned for false starts.

In the test room, the principal investigator was present to guide the procedural and testing events. Each participant was assigned an anonymous test number, 1 through 38, that matched prepared scoring sheets. To mitigate against a possible test sequence experience factor, both example melodies and the use of hand signs were administered in counterbalanced order. Thus, four participants were required to complete one full rotation. In a posttest informal interview, participants were encouraged to share their personal insights on the benefits of Curwen hand signs by responding to the prompt: "Tell me about your use of hand signs when you sight-sing. Are you a better sight-singer when you use the hand signs?"

All tests and interviews were administered by the same investigator. A Vox Optimus audio recorder was used to record participants' performances for subsequent analysis and scoring.

Sight-singing accuracy was the main source of collected data. Posttest scoring was completed by two raters in a 1-day session. Raters could replay the recordings as often as necessary. To be identified as accurate, a pitch needed to approximate pitch center, although discernable variations could qualify as acceptable. To be considered a rhythmically accurate performance, duration ratios were required to remain recognizable, although tempo variations could qualify as acceptable. For each melody, tests were scored on the perceived accuracy achieved in each measure. Each measure was worth 2 points, 1 point for acceptable pitch accuracy and 1 point for acceptable rhythm accuracy. Other viable scoring approaches have assessed points on a per-note basis (Demorest, 1998; Demorest & May, 1995; Henry, 2001; Henry & Demorest, 1994; Killian & Henry, 2005). The scoring approach chosen for this specific study (note to note within the context of a measure) was an attempt to quantify a holistic and real-life picture of each participant's sight-singing skills.

Results

Performance ratings were scored by two highly trained raters with 35 combined years of experience in secondary choral music classrooms. For sight-singing scores

Table 1
Group Results With and Without Hand Signs

Measure Occasion			
Group	<i>n</i>	<i>M</i>	<i>SD</i>
With hand signs			
No instrumental experience	12	8.25	4.81
Instrumental experience	26	11.34	3.62
Without hand signs			
No instrumental experience	12	10.71	3.02
Instrumental experience	26	10.90	4.38

with hand signs, the coefficient alpha interrater reliability was equal to .98, and without hand signs, the reliability was also .98. The coefficient alpha interrater reliability for consistency combined across all variables was .90.

The score range for each example was 0 to 16. The raters' combined performance scores for Sight-Singing Example A produced a mean score of 10.57 ($SD = 4.67$) and for Example B, 10.66 ($SD = 3.46$). Clearly, Examples A and B could be considered comparable.

Research Question 1 investigated whether there would be differences in sight-singing scores when high school choristers with extensive training in movable solfège syllables (coupled with Curwen hand signs) used or did not use hand signs. Descriptive statistics revealed a mean score of 10.37 ($SD = 4.23$) for students' sight-singing scores with hand signs and a mean score of 10.84 ($SD = 3.96$) without hand signs. The within-subjects effect of the repeated-measures ANOVA, comparing participants' sight-singing scores with and without hand signs, was not statistically ($F(1,36) = 0.57, p = .45$) or practically ($\eta^2 = .015$) significant.

Research Question 2 addressed the differences between the sight-singing scores with and without Curwen hand signs when considering participants' instrumental experience. Descriptive statistics are presented in Table 1. The results of the repeated-measures ANOVA comparing sight-singing condition with instrumental experience indicated statistically ($F(1,36) = 5.16, p = .03$) and practically ($\eta^2 = .125$) significant differences. To interpret the interaction, tests of simple effects (Maxwell & Delaney, 2004) were conducted.

The effect of instrumental experiences on sight-singing with hand signs was statistically ($p = .034$) and practically ($d = 0.77$) significant (no instrumental, $M = 8.25$; instrumental, $M = 11.34$). Students with instrumental experience scored significantly higher with the use of hand signs than did students without instrumental experience. Students without instrumental experience scored significantly higher when not using hand signs than they did when using hand signs ($p = .026, d = 0.61$; with hand signs,

$M = 8.25$; without hand signs, $M = 10.71$). No other statistically significant differences were found for any other tests of simple effects.

The third research question focused on the magnitudes of the relationships between demographic characteristics and sight-singing scores with and without the use of hand signs. The demographic characteristics analyzed, using Pearson's r , included class grade, years of sight-singing experience, and years of Curwen hand signs experience. The correlation between class grade and sight-singing scores with hand signs was low ($r = .14$), and without hand signs even lower ($r = .05$). There was a moderate correlation between sight-singing scores with hand signs and years of sight-singing experience ($r = .22$). The correlation for singing without hand signs was low ($r = .12$). The correlation between scores for sight-singing with hand signs and years of hand sign experience as negligible ($r = .05$); without hand signs, the correlation was small ($r = .15$).

An informal interview question encouraged participants' to share their personal insights on the benefits of Curwen hand signs. An assessment of responses indicated that they fell into one of three general classifications of student preference: (a) no hand sign gesture (18%), (b) a general rise-and-fall hand gesture (57%), or (c) specific hand sign gesture (23%).

Discussion

The high school choristers in this study had extensive training in sight-singing techniques that included movable solfège syllables coupled with Curwen hand signs. Because participants in similar studies have been less experienced with sight-singing instruction using these techniques, this study was designed to add to the knowledge base by investigating responses of more experienced sight singers.

The results of this study support the findings of five earlier studies that investigated the effects of Curwen hand signs on sight-singing scores (Autry, 1976; Frederickson, 1993; Jones, 1981; Martin, 1991; Youngson & Persellin, 2001). In each study, the effects of using Curwen hand signs resulted in no significant differences. Only Steeves (1984) found a significant difference in favor of hand signs.

Considering this study's relatively small sample size, the demographic composition was distributed satisfyingly. Scores achieved with and without the use of hand signs were essentially unaffected by three demographic characteristics: year in school, the number of years of sight-singing training, and the number of years of Curwen hand sign training. The very small relationship associated with year in school may be because the director of the choirs that participated in this study expected all members to sight-sing at an equally high level. The lack of relationship between performance scores and years of sight-singing with Curwen hand sign training failed to meet the investigator's intuitive expectations. A high correlation between task accomplishment

and years of training would seem logical. Why this variable resulted in only a moderate correlation could be attributable to small sample size. Another plausible yet unsubstantiated explanation is that choristers experience a slower rate of progress once the general sight-singing expectations of the advanced choir are reached. Future research with a larger sample size and attention to progress rates may provide different outcomes.

When using hand signs, study participants with instrumental experience performed significantly better than students without instrumental experience. This specific finding agrees with a number of studies, in which choristers with instrumental experience were found to be significantly more successful on sight-singing tests than choristers without instrumental experience (Casarow, 2002; Daniels, 1986; Demorest & May, 1995; Henry & Demorest, 1994; Killian & Henry, 2005). A possibly more intriguing result of this study, however, and different from the findings in the other studies, was that when the kinesthetic hand sign requirement was eliminated, both groups (with and without instrumental backgrounds) performed similarly; there was no statistical difference between them. The noninstrumental group produced one additional significant result, scoring higher without the use of hand signs.

It is relatively easy to appreciate how choristers with 6.1 average years of instrumental experience would successfully transfer instrumental reading skills to sight-singing. It is also reasonable to acknowledge a possible connection between the kinesthetic skills required to play an instrument and the kinesthetic skills required to use Curwen hand signs effectively. As a consequence, it is understandable how extensive instrumental training and Curwen hand signs training may interact to produce significant results. Determining why the noninstrumentalists scored higher without the use of hand signs requires additional research, but one possible explanation may be that this particular group included a number of students who were not kinesthetically inclined; or perhaps students who are not strong kinesthetically choose not to play musical instruments. Further investigation of how and why Curwen hand signs, a kinesthetic tool, benefit some students more than others could provide information with important pedagogical implications.

Following testing, each participant was encouraged informally to share verbally his or her opinions on the use of hand signs when sight-singing. Those preferring no physical gesture indicated that they did best when responding solely to the challenges of pitch and rhythm; physical gesturing did not enhance their sight-singing. The insights of those preferring general gestures supported findings of Frederickson's (1993) study, in which students performed best when pitch responses included the intervallic rise and fall of the hand. The participants in this study who preferred specific gestures did best when responding to pitches with specific hand signs. As noted in the literature, both teacher and student benefit when learning mode preferences are acknowledged (Dunn & Dunn, 1993; Gremli, 1996; Pautz, 1988; Persellin, 1988; Wallace, 1995).

Generalizing beyond the scope of this study or beyond the scope of similar Curwen hand signs studies should be done with caution. Yet, when viewed within the context of the body of literature, certain conclusions appear pedagogically plausible. The results of this study and five similar studies suggest that the use of Curwen hand signs do not result in significantly better sight-singing scores. However, a summation of the literature, combined with the interview responses of the participants in this study, suggest a connection between Curwen hand signs and learning mode preferences. Although some students may benefit from the use of hand signs, their use may put others at a disadvantage. To meet student needs, a calculated strategy may produce the most satisfying results. Students who learn to sight-sing using movable solfège syllables should be exposed to the potential benefits of Curwen hand signs. After a reasonable instructional period, the teacher may choose to allow students to decide the extent to which they incorporate the use of hand signs.

Further research to investigate relationships between students' learning mode preferences and sight-singing skills is strongly encouraged. A study of interest would include a comparison of the sight-singing skills and Curwen hand-signing skills of kinesthetically inclined choristers to those of aurally and visually inclined choristers. Valuable insights also could be gained from an investigation into possible influences of teachers' learning mode preferences on how they teach sight-singing skills.

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