

Critical Thinking in the Choral Rehearsal: An Initial Study of Approaches to Teacher Training

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Abstract

There is much conversation today about incorporation of critical thinking skills in educational contexts. However, no published research to date considers whether instruction in critical thinking linked with deliberate teaching of transfer skills might yield an increase of critical thinking behaviors in choral rehearsals. The purpose of this exploratory study was to examine two teacher training approaches for critical thinking instruction. We sought to determine whether undergraduate music education students ($N = 54$) could increase their time spent incorporating critical thinking skills in choral rehearsals. Participants, who were divided into two experimental groups, led one 3 to 5-minute choral rehearsal (pre-test) near the beginning of the semester. All participants then received instruction in the original Bloom's taxonomy, with appropriate terminology and defining of categories. The second experimental group received additional instruction, which included the revised Bloom's taxonomy, musical transfers for each of the subcategories, and an instructor-led simulated rehearsal incorporating critical thinking skills. Both groups then led a second 3 to 5-minute rehearsal (post-test) toward the end of the semester and were asked to incorporate critical thinking skills. All rehearsals were video taped, and analyzed with *SCRIBE* software. Results indicated that both groups of participants increased their time spent in critical thinking skills from pre-test to post-test ($p < .05$), and post-test scores (expressed as percentages of rehearsal time) of the second experimental group ($M = 13.93$) were significantly different from those of the first experimental group ($M = 2.76$).

Given the brief 3 -5 minutes' duration of rehearsal segments examined, these results reflected a mean time increase of about half a minute between experimental group B's pre- and post-test demonstrations of critical thinking behaviors. Yet this group's post-test percentage of time engaged in such behaviors (13.93%) exceeded the percentages (.84 - 6.39%) for critical thinking behaviors reported by previous observational studies (Garrett, 2009; Watkins, 1996) of secondary school choral rehearsals. Results from this initial study warrant continued investigation of replicable protocols that might equip choral teacher-conductors to transfer and apply critical thinking concepts in choir rehearsals of longer duration.

Keywords

critical thinking, choral rehearsals, teacher training

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Critical thinking has been defined in many ways by researchers and pedagogues, including: the propensity and skill to engage in an activity with reflective skepticism (McPeck, 1981), and the process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information as a guide to belief and action (Scriven & Paul, 2008). Ennis (1962) initially defined it as the correct assessing of statements. He later revised it to “reasonable reflective thinking that is focused on deciding what to believe or do” (Richardson & Whitaker, 1992, p. 548).

Paul (1984) discussed critical thinking in a weak and strong sense (monological vs. dialogical), comparing critical thinking to the thought processes a juror might experience during a trial, listening to multiple viewpoints, and considering all evidence before making a rational decision through critical discrimination. According to Dewey (1948), who coined the term “reflective thinking,” it is the “active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends” (p. 6). It is difficult to isolate a single definition of critical thinking within the literature when one considers the use of multiple terms related to critical thinking: reflective thinking, creative thinking, problem solving, and conceptual thinking (Garrett, 2009).

Commentators have offered multiple rationales for the value of critical thinking and critical thinking experiences, including the development of independent musicianship (Reahm, 1986) and a deeper engagement with learning and teaching processes (Pogonowski, 1987). From the music consumer perspective, Small (1987) proposed that citizens who carried critical thinking into the arts would most likely live richer, more complete, and happier lives. More specific to music education, higher order thinking skills have been linked to teacher effectiveness (Sheldon & DeNardo, 2004;

Standley & Madsen, 1991). Further, focus on higher order thinking skills in an observation task was considered a valid measure of a valued teacher characteristic (Sheldon & DeNardo, 2005). It appears that critical thinking is a valued trait in both students and teachers alike.

Given the importance ascribed to critical thinking, it is somewhat surprising that few studies have examined critical thinking in music education (Yarbrough, Price, & Bowers, 1991; Younker, 2002), especially in light of the National Commission on Excellence in Education’s fervent warning in *A Nation at Risk* (1983) that a large percentage of high school-aged students lacked higher order intellectual skills. Possibly, noted lack of these higher order skills meant they were not being taught. Existing studies to date indicated that music teachers spent very limited time engaged in critical thinking skills: less than 3% of time among selected middle school and high school band directors (Blocher, Greenwood, & Shellahamer, 1997), .84% of time with junior high and middle school choral directors (Watkins 1993), and 1.3% and 6.39% of time with high school choral directors (Watkins, 1996 and Garrett, 2009, respectively). Strauser’s (2008) estimate of 16.2% was the highest to date, although that taxonomy included modeling as a higher order behavior.

Measurement tools employed in these studies included the CRDI (Continuous Response Digital Interface), SCRIBE, and intervallic observation forms. Teacher behaviors included: (a) giving student feedback, (b) verbal behaviors attempting to enable students to transfer a musical concept, (c) asking questions in such a way that the answers contribute to formulation of new ideas, and (d) answering questions in such a way that the answers relate to a broader array of instances than the one at hand.

Perhaps other teaching responsibilities and performance pressures may explain why teachers apparently devote so little time to critical thinking skills (Small, 1987). Field

(1997) cautioned against placing too much emphasis on performance standards within the rehearsal process, but Snow and Apfelstadt (2002) argued that a combination of high quality choral literature, an environment that allows for appropriate musical decision making, and a director who acts as a guide and facilitator can maximize thinking and learning in a choral setting. In other words, comprehensive musicianship and performance preparation need not be mutually exclusive goals.

Conceivably, teachers might not take time for teaching critical thinking because they lacked the training in strategies to incorporate it. Various researchers and pedagogues have suggested some strategies for teaching critical thinking: (a) have students conduct in rehearsal, so they can make personal decisions about the music (Reahm, 1986); (b) engage in music listening, classroom discussion, and reflective questioning (Pognowski, 1989); (c) structure an atmosphere of cognitive challenge, planning a specific incident of intellectual dissonance (Small, 1987); (d) use rehearsal journals and open-ended questions to direct students toward reflective thinking (Holden, 2009; Thompson, 2009); and (e) use metaphoric language in rehearsal to stimulate higher order thinking (Gonzo, 1977). Strategies for assessing critical thinking have also been identified, including use of portfolios (Brown, 2008; Field, 1997; Gardner, 1989), learning logs or journals (Stevens, 2001; Thompson, 2009), self reporting rubrics (Sindberg, 1998), and written assessment by means of essay ranking (DeTurk, 1989, 2002).

Bloom introduced his taxonomy of educational objectives in 1956. Hierarchical in nature, these objectives moved from basic to more complex. The upper levels of this taxonomy included analysis, synthesis, and evaluation, and these three abilities have commonly been referred to as critical thinking skills. In response to criticism that Bloom's taxonomy had become outdated, contemporary

researchers attempted to revise the taxonomy (Anderson, Krathwohl, Airasian, Cruikshank, Mayer, & Pintrich, 2001). See Appendix A. Categories were changed from nouns into verb categories, with emphasis on the subcategories of the six cognitive processes. Create (formerly synthesis) was moved to the top of the hierarchy to become the most sophisticated behavior. Three researchers (Garrett, 2009; Hanna, 2007, and Strauser, 2008) incorporated the revised taxonomy with studies in music education contexts, hopeful that this model may give music educators a common terminology with respect to music learning objectives. Garrett (2009) identified a need for teacher trainers to help undergraduates learn to incorporate critical thinking into music rehearsals, in order to encourage the acquisition of these skills in both teachers and students. Previous research determined that teacher training was effective in eliciting increased critical thinking activities among students (Hudgins & Edleman, 1986, 1988) and that the ability to think critically could be developed with training (Sheldon & DeNardo, 2005). Additionally, Madsen and Madsen (1998) and Jarmon (2009) discussed teaching for the transfer of ideas from one area to another (or theory into practice) as a means of assessment, adding that this transfer was not automatic but a learned technique that must be taught in order to be successful.

Although some researchers have examined elements of critical thinking and others have explored teaching for transfer, currently no published research links the two by investigating whether instruction in critical thinking and deliberate teaching of transfer skills will yield an increase in critical thinking behavior. The purpose of this study was to examine the effects of two teacher training protocols on the time preservice teachers ($N = 54$) spent incorporating critical thinking skills, as defined by the original and revised forms of the upper three levels of Bloom's taxonomy, during peer teaching choral rehearsal segments.

Specific research questions included:

1. Will preservice music educators receiving instruction in critical thinking skills transfer this instruction into their teaching by increasing the time spent incorporating critical thinking in choral rehearsals, as determined by systematic observation of rehearsal videos using SCRIBE software?

2. Is there a significant difference in time spent on critical thinking skills between participants who are taught the principles of Bloom’s taxonomy (experimental group A) and participants who are additionally given a specific example and a simulated rehearsal that transfers these principles into practice (experimental group B)?

Method

Participants included undergraduate music education majors (*N* = 54, 25 females, and 29 males) from three large state universities in the southeastern, western, and northeastern regions of the United States. All participants met minimum criteria of having taken two courses in conducting and an introductory course in music education and all were enrolled in a Choral Techniques course in the semester of the study. All participants conducted two rehearsals (in a peer teaching context) of three to five minutes each on a unison selection, once at the beginning of the semester (pre-test), and once toward the end of the semester (post-test).

The researchers selected the master list of musical selections (see Table 1).

Table 1. *List of Musical Selections used in the Study*

Title of Selection:	Composer/Arranger:
Art thou Troubled?	George F. Handel
Feed my Lambs	Natalie Sleeth
Have you Seen but a White Lily Grow	Henry Leck
I Know Where I’m Going	Earlene Rentz-Turner
Marienwürmchen (Ladybug)	Johannes Brahms
My World	Ruth Elaine Schram
Orpheus with his Lute	Ralph Vaughan Williams
Path to the Moon	Eric Thiman
Sally Gardens	Benjamin Britten
She’s Like the Swallow	Ralph Vaughan Williams
Stopping by Woods on a Snowy Evening	Vera Kistler
The Birds	Benjamin Britten
The Pasture	Daniel Kallman
The Song that Nature Sings	Ruth Elaine Schram
This Little Light of Mine	Ken Berg
This Shall be for Music	Mark Patterson
To Music	Betty Bertaux
Velvet Shoes	Randall Thompson
Where’er you Walk	George F. Handel

All selections were in English and in unison, with optional divisi or second parts/descants omitted. Although unison selections are less typical in collegiate choirs, we chose simple music so that participants would not have to struggle with pitches and rhythms and could accomplish something more in their brief teaching segments. No participant was allowed to choose the same piece another participant from the same school had chosen. For the first rehearsal, participants were instructed to focus on securing pitches and rhythms. For the second rehearsal, the same piece was rehearsed, and participants were instructed to incorporate critical thinking skills into the rehearsal.

Both groups received instruction in Bloom's taxonomy and critical thinking principles (convergent vs. divergent thinking, terminology, etc.) as well as guidelines for their next assignment—to incorporate critical thinking skills into their rehearsals. We attempted to keep instruction the same across the three universities by using the same handouts/scripts and collaborating *a priori*. After this instruction was delivered, participants drew names out of a hat and were assigned to the two experimental groups (A and B) accordingly. Experimental group A participants were then dismissed. Participants in experimental B group additionally received instruction in the revised Bloom's taxonomy, in particular the cognitive dimension categories and processes (see Appendix A) as well as a specific example of questions that might be asked in each subcategory to elicit critical thinking (see Appendix B).

A simulated rehearsal (conducted by the regular teacher of the class) ensued to teach participants in experimental group B how to transfer principles from the revised Bloom's taxonomy into practice, using the choral octavo "Something Told the Wild Geese," by Mary Lynn Lightfoot. Participants in experimental group B were given copies of the scripted rehearsals and were asked to review these while planning their teaching sessions. The entire

treatment for experimental group B lasted approximately 30 minutes.

We video recorded all participants during their pre-tests and post-tests. We subsequently converted these data to Quick Time movies and then imported them into *SCRIBE* software (Duke & Stammen, 2006) for systematic observation. Data analysis in *SCRIBE* included clicking on boxes (assigned categories) while observing videos; the software computed total time spent in each category. We established two categories for data coding in *SCRIBE*: time spent incorporating critical thinking skills, and time not spent in critical thinking (nonperformance, lower order thinking, and silence were included in this category).

As with previous research (Garrett, 2009; Watkins, 1993, 1996), critical thinking was operationally defined as the upper three levels of the original and revised Bloom's taxonomy (analysis, synthesis, evaluation; and analyze, evaluate, create, respectively). Critical thinking included teacher engagement in expository verbal mode using technical language, academic or social instruction (including student questioning), and feedback on student participation. Student responses to higher order questions, performance indicating critical thinking processes, and physical responses to music making suggesting critical thinking (e.g., showing contour of melody with arms, raising a finger when evaluating some musical concept, etc.) were also included in this category.

As additional control measures, we did not code videotapes to identify experimental group A or experimental group B participants. Likewise, we provided no indication of whether the excerpt was a pre-test or a post-test measure. We randomized the order of the video-recordings for judging. No researcher observed her own students' data. The two researchers responsible for data coding collaborated and initially watched videos together to ensure consistent categorization of engagement in critical thinking and familiarity with *SCRIBE*. Once there was general agreement on what

constituted time spent in critical thinking, they then viewed 20% of the rehearsals independently. Reliability (computed using a Pearson correlation) was 96.49%, which was considered acceptable.

Results

Data from pre-tests and post-tests, initially calculated as seconds spent in critical thinking activities, were converted into percentages of total rehearsal, for standardization. A three-way repeated measures *ANOVA*, with two between subjects variables (school and group) and test as the repeated measure, revealed significant main effects for group [$F(1, 48) = 48.15, p < .001, \eta^2_{\text{partial}} = .50$], test [$F(1, 48) = 104.93, p < .001, \eta^2_{\text{partial}} = .68$], and their interaction [$F(1, 48) = 48.27, p < .001, \eta^2_{\text{partial}} = .50$]. There was no significant main effect for school, so the three schools' samples were treated as one population.

Group means (expressed as percentages) indicated that post-test scores of experimental group B ($M = 13.93, SD = 8.11$) were higher than those of experimental group A ($M = 2.76, SD = 2.56$). Pre-test scores were similar for both groups ($M = 0, SD = 0$ experimental group A, $M = .10, SD = .54$ experimental group B). The test by group interaction is illustrated in Figure 1. It shows that there was more variation between groups in the post-test.

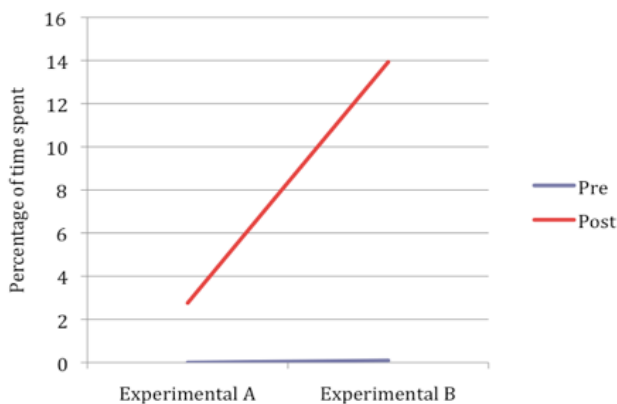


Figure 1. Interaction between test and group

Discussion

The purpose of this study was to examine whether undergraduate music education students would increase time spent incorporating critical thinking skills into choral rehearsals after experiencing two protocols: instruction in the original form of Bloom's taxonomy (experimental groups A and B) and additional instruction, which included the revised Bloom's taxonomy, musical transfers for each of the subcategories, and an instructor-led simulated rehearsal incorporating critical thinking skills (experimental group B). Both groups improved between pre-test and post-test measures, not surprising because we did not ask them explicitly to incorporate critical thinking into their first rehearsals. The group by test interaction can also be explained in this way.

During the post-test, experimental group B spent more time in critical thinking activities than did experimental group A. This finding suggests that the additional instruction, transfers using actual music, and the simulated rehearsal were beneficial to participants. Apparently, having a scripted rehearsal and examples of each category allowed the participants in experimental group B to study, plan their rehearsal, and prepare in a way that was more effective. Participants who were successful in the task incorporated the following strategies: (a) asking students to use their hand/body to show dynamics, phrasing, articulation, etc., (b) asking students to describe the mood of the piece and how the text functioned, and (c) asking the class to divide into two, and having one group critique the other on some musical element (tone quality, how well dynamics were executed, etc.).

In general, participants attempted to follow directions for their respective assignments, but some simply did not know what to do. Nine experimental group A participants had a post-test score of zero. When viewing all the videos, it was apparent that experimental group A members believed the questions they were

asking were generating critical thinking, but in reality they were not. For example, “what is the dynamic marking here?” and “what is the meaning of this text?” were questions corresponding to the first three levels of Bloom’s taxonomy (remember, understand, or apply) but not the upper levels. Most notably, there seemed to be a sense that the goal was to ask questions, to elicit thinking about *something*, and invariably participants from experimental group A observed those of experimental group B and attempted to follow suit. Nevertheless, there were some participants who were able to use their basic understanding of critical thinking and apply it correctly, even without the benefit of the added instruction and transfer task. Thus, teacher trainers might consider that simply presenting and defining terms, and asking students to exercise these concepts in a teaching setting, could potentially yield positive results, even if minimally so.

Results of this study are consistent with Hudgins and Edleman, (1986, 1988) and Sheldon and DeNardo (2005) in that teacher training was effective in eliciting increased critical thinking activities among students/preservice teachers. Likewise, as with Jarmon (2009) and Madsen and Madsen (1998), transfer was not an automatic task, so it is unwise to assume that all students will automatically be able to transfer learning concepts into musical rehearsals successfully without additional guidance. Given this additional structure, however, and a scripted sample rehearsal, these participants yielded significant gains, to 13.93% by the post-test, which is larger than percentages observed in earlier studies (Blocher, Greenwood, & Shellahamer, 1997; Garrett, 2009; Watkins, 1996), where researchers were simply observing what naturally occurred.

There are several limitations of this study to consider. Rehearsals were only three to five minutes, so even one instance of critical thinking could have yielded a large percentage of time. Considering that the difference between 2.76% and 13.93% of a five-minute rehearsal

amounts essentially to several seconds, one must acknowledge that statistically significant differences are not always practical differences. Also, participants were only observed in one rehearsal following the treatment, so it is possible these activities might decrease with additional measures. Future studies should include longer rehearsal times and multiple measures following the treatment.

As mentioned previously, a possible order effect might have ensued in that some experimental group A participants observed their experimental group B counterparts and adjusted their own lessons accordingly. We suggest that follow-up studies allow all experimental group A participants to go first to avoid this possible contamination.

There is always a possibility with multicenter studies that treatments were not administered in exactly the same way, that teacher effect could be evidenced, or that one group of students understood the material better than another. Future studies may incorporate video taped instruction as treatment to ensure standardization. Further, history and maturation are possible threats to internal validity with this particular experimental design. Nevertheless, there was no main effect for school.

Another important issue has to do with the two groups’ treatment times. Because experimental group A was simply given instruction about Bloom’s taxonomy, experimental group B participants essentially received twice the treatment time, thereby potentially providing them with an advantage during the post-test. We structured events in this way in order to identify whether knowledge of concepts was sufficient by itself, but perhaps equal time spent in this instruction, with Experimental group A participants engaging in further defining and clarifying of critical thinking ideas and terminology, would have yielded a cleaner design and a fairer comparison of participants’ understanding.

Future studies may investigate more student-based measures of critical thinking. Which activities tend to solicit the most engagement in

higher order responses in choral students? It is, of course, difficult to gauge what is going on in the minds of students while they are performing, but perhaps there are tools that could be helpful in providing teacher trainers with methods of assessing when critical thinking is occurring. It may also be useful to elicit student feedback regarding teacher behaviors. Student reports could potentially identify which types of questions were confusing or particularly effective in getting them to think at a higher level. Additional studies might also examine critical thinking with instrumental music teachers, because with no text involved, rehearsal of purely instrumental music may entail a different skill set. Further, checking for understanding may provide a gauge for teaching effectiveness and is worthy of more analysis. Perhaps observations of subsequent rehearsals (in participants' student teaching or in their own classrooms when they become teachers) could yield valuable information about whether participants continue to incorporate strategies for critical thinking into their teaching as a result of this instruction.

Given both the national emphasis placed on developing students who are able to think critically in the classroom and a desire to enable independent musicianship, it is incumbent upon music education researchers to continue to assess strategies that may assist preservice teachers in the development and application of critical thinking skills. The present study is an initial effort to examine these matters in the context of choral music teaching and rehearsing. It provides replicable protocols that may encourage subsequent research, and it identifies possible refinements that may inform the designs of future studies in this area. ✪ IJRCS

Institutional Review Board Approval and Compliance

The authors obtained approval from an appropriate Institutional Review Board to conduct this research in a manner that assured the ethical treatment of participants and the confidentiality of participant information.

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Appendix A

Bloom's Revised Taxonomy

Cognitive Dimension Categories & Processes

- 6 CREATE**
 - 6.1 Generating
 - 6.2 Planning
 - 6.3 Producing

- 5 EVALUATE**
 - 5.1 Checking
 - 5.2 Critiquing

- 4 ANALYZE**
 - 4.1 Differentiating
 - 4.2 Organizing
 - 4.3 Attributing

- 3 APPLY**
 - 3.1 Executing
 - 3.2 Implementing

- 2 UNDERSTAND**
 - 2.1 Interpreting
 - 2.2 Exemplifying
 - 2.3 Classifying
 - 2.4 Summarizing
 - 2.5 Inferring
 - 2.6 Comparing
 - 2.7 Explaining

- 1 REMEMBER**
 - 1.1 Recognizing
 - 1.2 Recalling

Appendix B

Examples of Critical Thinking Applied to *Something Told the Wild Geese*

IV. ANALYZE

4.1 Differentiating

- *How does the piano introduction function, or what information does it give the listener? (introduces the melody)*

4.2 Organizing

- *Form: A¹, A², transition, A³
How are these sections different?(unison/2 pt; use of canonic and “polyphonic” entrances, and 2pt; similar to A¹, but ending functions as a coda.)*

4.3 Attributing

- *Why did composer change the repeat of each A? Was it because of text painting? What about cadential motion? (ms 14= half cadence; ms. 23 =full cadence, etc.)*
- *Within the piano interlude, changes occur, and syncopated pattern goes from LH to RH. Why might this occur? (building intensity to lead to the Recap of A)*
- *Ask students to identify an adjective that describes the overall mood of the piece. Have them write that down at the top of the first page and demonstrate that adjective using only their facial expression*

V. EVALUATE

5.1 Checking

- *(Any rehearsal process could be monitored: musical elements: melodic contour, accents, cadential role, textural or harmonic activity.) How are musical elements used to emphasize the poetry?*

VI. CREATE

6.3 Producing

- *Have students create their own movement that aids in the process of singing. (How might you move to demonstrate a crescendo? What might you do to show an accent?)*
- *Ask students “If you were the conductor what gesture or movement would you use to show _____ (musical element)?”*