M J R M E

MISSOURI JOURNAL
OF
RESEARCH
IN
MUSIC EDUCATION

NUMBER 38
2001

PUBLISHED BY THE
MISSOURI MUSIC EDUCATORS ASSOCIATION

Missouri Journal of
Research in Music Education

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Adults and Computer-Assisted-Instruction in Beginning Piano: Influences on Musical Self-Efficacy and Music Education Attitudes

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The purpose of this study was to determine whether adults participating in a computer-assisted-instruction piano course for beginners would show significant increases in musical self-efficacy (i.e., the level of expectation regarding one's ability to perform a given task successfully). Additionally, the study examined influences of the course on adults' attitudes towards music education. An elementary school music lab equipped with the program Musicware Piano, Course 1 *was used for the 8 class sessions. Adult students (age range 31 to 55 years) worked independently through the software. Participants with children age 18 or younger living at home comprised 72% of the class. No significant difference in musical self-efficacy was found. Parents taking the course reported increases in their (a) interest in their child's school music program, (b) expectations for their child's musical skills and, (c) ability to guide their child's musical development. The self-paced curriculum, on-site teacher help, and ability to review lessons appeared to be important aspects of the class. Nonmusical benefits of the course included confidence, relaxation, and nostalgia. Adults considered the class to be a positive experience despite computer and software problems.*

Research pointing to the academic benefits of studying music has been widely publicized as a solid foundation for supporting music in the schools. While some educators have been quick to point out the necessity for caution in making overstated claims (Radocy, 1997), public interest in music study continues to thrive. Articles emphasizing the benefits of computer-assisted-instruction (Berz, 1990; McGreer, 1984;

Parrish, 1997), have suggested that music/computer labs can be utilized to enhance curriculum. Music labs vary in design but frequently include various software programs for a computer that is midi-linked to a keyboard. Other labs, focusing on music literacy and keyboard playing skills, consist of digital pianos arranged for small or large group instruction.

Funding for music technology has become a necessary point of discussion among music educators. Some teachers have been able to secure grants from outside sources to fully fund music labs or have received matching funds from districts or other sources to subsidize a music technology budget. The grant application process can be tedious, however. Compiling the appropriate paper work, securing necessary signatures of approval, and establishing supporting research can take many months. Even after the grant is approved, the necessary steps for system ordering, set up, and training can mean waiting nearly a year before the lab is fully functional in the classroom.

Some teachers have found a more immediate solution to their technology needs. As keyboards continue to be popular among students, many families are taking advantage of their recent affordability and are purchasing them for the home. Music educators have seen two opportunities in this trend. First, students are eager to learn to play piano and to try sequencing or composing with their own keyboard. Secondly, classroom keyboard labs can be implemented using student-owned instruments. Teachers might well consider developing keyboard programs based on these opportunities. By being creative and flexible, music educators can start units on keyboarding by tapping into the preexisting keyboard interests of their students and pursuing the availability of instruments in the home. This type of program may benefit the children while bridging the gap between the school and the home environment. (Appell, 1993; Hoffer, 1988).

Music education opportunities based in the home are not confined to the children. Adults are also accessing music activity through their personal keyboards (Boswell, 1992). Digital accompaniment tracks, one-finger bass patterns, and other

technological functions on basic model keyboards have enabled even the most elementary pianists the ability to create complex musical sounds. These possibilities, easily available in the home, have sparked an interest in adults to develop music literacy and to learn piano skills.

Technological changes in the homes and in society change classroom methods. These changes also make lifelong learning a necessity. Music educators must stay current on trends in education at all age levels so present-day music learning is available to all generations. Adult music education is an area worthy of increased attention.

Related Literature

In a study of operation and content of continuing education programs at selected universities, Secrest (1982) found there was no widely accepted body of knowledge upon which program decisions are based. Instead, each university designs its own program based on variables such as staff expertise, clientele interest, and department direction. Atkinson (1986) came to similar conclusions concerning community education programs. He stressed the importance of assessing needs before developing an adult education program. Because of the voluntary nature of adult education, program directors were instructed to carefully assess musical tastes and degree of development of prospective adult students. This information would formulate the initial classes offered for adult community education programs. From that point, administrators could develop course offerings branching into a multitude of learning experiences encouraging active participation and developing a wide range of musical tastes among older learners.

In a report from the U.S. Department of Education (1998) 40% of adults participated in adult education activities in 1995. This was up from 32% in 1991. Statistics show adults today are seeking classes for more than just job-related needs. Half of those enrolled in adult education in 1995 took personal development courses. Higher socioeconomic status, higher levels of completed education, and positive attitudes towards

education predicted a stronger possibility of adult education participation than did personality traits (Yang, 1998). The poor, less educated, and minorities were more prone to believe they were too old to learn new skills resulting in a reduced enrollment population (Chimene, 1987). On the other hand, Patchen (1984) determined that the elderly do have the ability to improve their music skills.

Several recent studies report adults taking courses in the arts to experience a variety of musical activities and to enhance the quality of their lives (Boswell, 1992; Myers, 1990; Patchen, 1984). McCullough (1981) stated adults found the role of music to be a recreational and a personally fulfilling endeavor. In addition, the importance of music increased as the person got older. Specific results concerning adult music education showed that among adults who expressed interest in music participation, piano was the instrument most frequently chosen for private study followed by voice and guitar. These adults were between the ages of 25 and 55 years, lived in a city, had higher-than-average incomes, and held at least an undergraduate degree (Bowles, 1991). Research by McCullough (1981) reported older adults preferred free, afternoon classes offered once per week in age-segregated groups.

In addition to knowing the adult student profile, music educators should be aware of differences in adult learning styles. Two characteristics that tend to separate adult learners from younger learners include the desire for self-direction and the spontaneous incorporation of personal experience in new learning (Myers, 1992). People over 60 years of age command an above average self-esteem level and posses a sense of arrival, which brings stability, maturity, competence, and responsibility to learning. Older adults also show interest in the process of learning rather than only in attaining goals. As people grow older, they become increasingly different, that is, there is an increased range of individual differences among adults that must be addressed with a variety of teaching methods (Achilles, 1992).

Self-directed learning has proven to be successful in adult music education programs. The self-directed learning model

encourages students to manage the learning plan's direction while teachers assume the responsibility for defining goals and strategizing outcomes. This approach promotes independence and self-confidence for the adult student resulting in a life-long learning pattern (Myers, 1992).

Learning has become a life-long pursuit for many at the dawn of the twenty-first century. Adults are seeking classes for both job-related needs and quality of life issues. People are living longer, are maintaining their health, and are pursuing a vigorous life style through advanced years. Myers (1992) asked educators to rethink the philosophy that preparation for, rather than education through, adulthood would lead to a society that understands, appreciates, and values music and music learning. He recommended enlarging community-based music learning opportunities that offered instruction to adults beyond high school and college. Trying to justify music and the arts as a legitimate component of basic education may be enhanced if music is seen as a life-long pursuit fulfilling expressive needs.

Educators may be able to ensure music education for future students by investing in adult music education. With active adult participation, music education through high school and college may receive increased support. In addition, adults would be providing a broad spectrum of active music involvement and would be establishing role models for younger music students encouraging them to stay involved in music study beyond the fifth grade. A study by Bowles (1991) reported that the more adults were involved in music performance, attendance, and study, the higher the probability that their children would be involved in music through adulthood. The study also showed that early music experiences provided in the home were highly influential in developing the music interests of children. Bloom and Sosniak (1982) cited parents as the primary models for talent development in children. Emphasizing in the home what was learned at school proved to be reinforcing and important in encouraging the pursuit of talent in various areas. Levinowitz (1993) considered children without music in the home to be "musically at-

risk" and suggested a comprehensive parent education program as part of the solution.

Various music skills courses have been implemented in adult education settings (Keenan, 1995; Myers, 1990; Tims, 1999). In each report there was a distinctive contrast to results examining significant improvements in performance skills. Instead, these studies emphasized characteristics of music learning other than skills attained. Adult learners are being encouraged to value the experience of learning and playing an instrument and to enjoy the non-musical benefits of music study (Blasco, 1999).

Keenan (1995) examined the Yamaha *Music in Education* program as an adult curriculum. Participants were given a performance skills pre- and posttest, were asked to keep a journal throughout the course, and responded to a final survey. Students performed significantly better on the posttest than on the pretest. Positive and negative comments collected through the journals and surveys showed the greatest number of positive comments occurred during the second half of the course. Analysis of comments also showed the proportion was more positive than negative during each half. It was concluded that with modifications, the Yamaha program was appropriate for older adult learners and that participation was a positive experience.

Myers (1990) reported that self-efficacy, a level of self-expectation regarding one's ability to perform a given task successfully, significantly improved as a result of adults participating in a sequential, skills-based music learning situation taught in six class sessions. His research established reliability for the Musical Self-Efficacy Scale (MSES) which he designed. Items on the test focused on: (a) initiative, or confidence, in ability to perform active music tasks; (b) willingness to expend effort; and (c) willingness to continue learning under adverse conditions. Adults in the class were enrolled in a basic skills music course that followed a routine involving structured movement, sequential rhythmic and melodic reading or performing tasks, sequential recorder playing tasks, structured sequences, association of notation with aural

stimuli and verbal syllables, structured rehearsal, and aural discrimination strategies. Students completed the MSES by individual interview before and after the course. Raw scores indicated self-efficacy gains for six of the eight subjects. This study did not establish the relationship between self-efficacy and achievement nor other methods and techniques appropriate for enhancing self-efficacy in older learners. The MSES was suggested to be an indicator of program development possibilities in adult education. That is, an experimental class showing enhanced self-efficacy could determine learning opportunities that older adults perceive to be within their capabilities.

Group keyboard lessons for retirees in another study showed the benefits of learning piano from a music therapy perspective. Tims (1999) led research measuring quality of life issues in the adult students as they participated in two 10-week semesters of music lessons. A separate control group was monitored for the same quality of life issues but did not receive piano lessons. A decrease in anxiety appeared after only 10 weeks and remained after 20 weeks for those taking the lessons. The control group showed no change. Decreased anxiety was related to improvement in cognitive performance, as well as enhancing learning, decision-making, and feelings of well being.

Loneliness scores also decreased across the span of the lessons for the experimental group but not the control group. A separate social support test was administered to verify that external support had not changed for the individuals. Results from this test confirmed that group keyboard lessons were solely responsible for increasing students' internal perception of support, thus decreasing their feelings of loneliness. In addition, depression scores decreased for the keyboard group but not for the control group.

Preliminary findings also showed there was an increase in human growth hormone (hGH) among the adults receiving keyboard lessons. Human growth hormone positively affects such aging phenomena as energy levels, wrinkling, osteoporosis, sexual function, muscle mass, as well as aches and pains

(Reuter, 1999). Final results from this study will seek to determine if biological changes underlie psychological changes. In other words, the study will try to decide if the biology changed first or the psychology (Music lessons, 1999).

Purpose

This present study was designed to evaluate a computer-assisted-instruction (CAI) method for beginning adult piano students. Specifically, the purpose was to determine whether participation in the course would show significant differences in adult students' musical self-efficacy and attitudes towards music education.

Musical self-efficacy was defined as a level of expectation regarding one's ability to perform a given task successfully. Although the software used as the curriculum of the course taught piano skills exclusively, musical self-efficacy included a full range of musical activities including singing, playing instruments, and listening. This study sought to determine if learning beginning piano skills through CAI would affect initiative or confidence in performing other active musical tasks. Self-efficacy results would also determine differences in students' willingness to expend effort or willingness to continue learning under adverse conditions.

Music education attitudes were limited to the following areas. First, attitudes towards students' perceived ability to learn to play piano as an adult would be addressed. Secondly, recognition of any nonmusical benefits to music study among adult students would be determined. The third area of music attitudes to be explored involved music in the home. The study would seek to define areas of music activity that had developed or increased because of adult or parent involvement in a CAI piano course.

Specific research questions addressed were:
1. Will participation in an adult CAI course in pi-and increase musical self-efficacy?
2. Does the software program meet adults' expectations in musical skills learned and give them

the ability to reach their piano goals?

3. Will CAI piano study benefit adult students in nonmusical ways?
4. Will CAI piano study increase musical activity in the home?
5. How will CAI piano study influence parents' attitudes towards their child's music education?

In addition to these questions adults were asked to evaluate the course and define likes and dislikes about the class.

Method

Design and Materials

For this study adult piano classes using CAI were offered in a 4-week session during the month of September. The classes met for 50 minutes each Tuesday and Thursday (two times per week) for a total of eight classes. Two class groups were scheduled each evening allowing a maximum of 24 students to participate. Class starting times were 6:00 p.m. and 7:00 p.m. Permission to use a new music lab located in a suburban elementary school was given by the elementary building principal and elementary music teacher. Appropriate fees were covered by a research grant so adult students were able to participate for free. The school had purchased music lab equipment with a state technology grant matched with district funds in the spring. The lab was fully functioning the following January. Lab equipment included 12 independent stations using Compaq Deskpro computers, Fatar CMS61 keyboard controllers, and Labtec C324 stereo headsets.

Adult students were asked to work independently through the program *Musicware Piano, Course 1*. The elementary music teacher and the researcher attended each class to help with system problems or to answer questions. The elementary teacher also served as building security as required by the school district for activities held outside the normal school hours.

Participants

Class members volunteered for this study in one of three ways: (a) signing a class roster at a school-wide technology open house (April), (b) returning a registration form from a monthly parent newsletter (May), or (c) signing a class roster at fall school registration (August). In accordance with the building principal's request, all registered class members had to be a parent, volunteer, or employee of the elementary school. Participants were asked to register for the course only if they could commit to at least six of the eight scheduled class times. Although 26 adults originally registered for the classes only 19 were able to complete the course. All adults failing to finish cited scheduling conflicts as the primary reason to drop the class. One class member did not return post-survey information, so the individual's pretest scores were eliminated from the results leaving $N = 18$.

Student ages ranged between 31 and 55 years. Half of the students were over 40 years old. Only 2 class members were male. Participants with children age 18 or younger living at home comprised 72% of the class. While there was no statistical data on previous musical knowledge, all adults considered themselves to have no previous piano background or play piano at a beginning skills level.

Procedure

The same procedure was followed for both the 6:00 p.m. and 7:00 p.m. classes. The adult students completed the Musical Self-Efficacy Scale (MSES) designed by Myers (1990) at the beginning of the first class. As each student arrived they were asked to individually read the survey and respond to the items. All participants marked their paper with a four-digit code (i.e., the last digits of a phone number or a social security number) to ensure their privacy but allow the researcher to pair their pretest and posttest scores. When all surveys were completed, class members introduced themselves to the group. Afterwards, a brief introduction was given about the software

and a reference page with basic program commands was given to each participant. The remaining class time and subsequent classes allowed students to work independently through the piano course.

A conscious effort was made to keep the class atmosphere relaxed by greeting students at the door, engaging in conversation, and de-emphasizing performance skills or progress through the lessons. Class members were encouraged to proceed through the program sequentially, to take advantage of the scoring and review options built into the software, and to ask for help when needed.

Musicware, Course 1 was divided into eight units of 20 to 25 lessons each. The program automatically scored students for each lesson. A **review scores** icon was available to check individual lesson percentages and final unit scores. Adults were shown how to improve scores either by clicking a **do over** button on the screens as the lesson proceeded or by reviewing previous lessons through the **course outline** icon.

Attendance was taken at each class and students were allowed to come for a double session (both class times) as computers were available. During the session there were anywhere from 1 to 3 computers down but class members were flexible so no one was ever denied participation in any class. Some members were willing to switch to the later class time that had open slots despite nonworking computers. Class members who were part of the faculty or who were parent volunteers opted to do their work on the computers during breaks or before and after school rather than attend evening classes. This also relieved congestion due to computer problems.

The MSES was given again after the final class session as a posttest. Data concerning music education were also collected from an additional survey. Students attending the last class responded to and returned the surveys during class time. Surveys were sent to the seven adult students that were absent from the final class time. Students were asked to return completed surveys to the elementary music teacher within 1 week; five surveys were returned within the allotted time. Phone

messages were left for the two class members who had not returned their papers at deadline. These calls resulted in one more posttest returning. The remaining posttest was never received. Surveys were routed to parents as a take home paper from their child attending the elementary school. The surveys were returned in the same manner.

Results

Musical Self-Efficacy Scale

The MSES determined results for the first research question, which asked if CAI in piano would increase musical self-efficacy. After converting scores for reversed items (i.e., questions 4, 5, 6, 7, 10, 11, 16, 18, 20, 22, 25) the student's responses were added to determine individual scores. Pretest and posttest scores were paired by subject and compared to show a gain or loss. Eight subjects showed a loss in musical self-efficacy and 9 showed a gain. One subject's score was unchanged from pretest to posttest. Distribution of scores was spread evenly throughout the range ($M = 1.22$, $SD = 10.44$) creating a mirror image of positive and negative gains. Comparisons between pretest and posttest gains were calculated using a t-test for correlated means which indicated a non-significant difference ($t = 0.65$, $df = 17$, $p > .05$). The adults taking CAI piano lessons did not show a significant difference in musical self-efficacy.

Music Education Attitudes

Question 2 specifically addressed the *Musicware Piano* program. Survey results showed 72% of the adult students reported the software as meeting their expectations in musical skills learned and 39% agreed the program had given them the ability to reach their piano goals.

Question 3 asked students to describe non-musical benefits of the piano course. Thirty-nine percent of the adults reported the class seemed to have an effect on their life in nonmusical

ways. Three general categories of benefits were confidence (22%), relaxation (11%), and nostalgia (6%). Confidence statements referred to learning music or computer skills and to following through on additional commitments. Responses related to isolation from responsibilities, time set aside for oneself, or enjoying peace and quiet were categorized as relaxation. Nostalgia was attributed to statements describing the memories associated with the music of the program.

Increased musical activity in the home as a result of taking the piano course was the focus of Question 4. Piano instruction was cited by 39% of the class as a direct influence for more musical activity in the home. Playing the piano at home had increased for 28% of the class. Students experienced increased piano activity in both their personal playing and in their children's practicing. Pursuing another instrument with renewed interest was reported by 6% and another 6% stated they were now interested and able to help their child with music study at home.

Question 5 asked parents to report ways the CAI piano class had influenced their attitudes towards their child's music education. The posttest survey asked parents to report changes in attitude using a 5-point Likert scale rating increases from *not at all* to *a lot*. Only answers from parents of school-aged children (72% of the class) were included in the results. Parents reported increased involvement in their child's musical education in three areas. Specifically, posttest levels showed increases in (a) interest in the child's school music program ($M = 4.77$, $SD = .44$), (b) expectations for the child's musical skills ($M = 4.64$, $SD = .50$), and (c) ability to guide the child's musical development ($M = 4.45$, $SD = .93$).

Course Evaluation

Two specific areas of course evaluation were included in the survey. Adults were asked if the class was fun and if it was challenging. Learning piano through CAI was considered to be fun by 89% of the group. Those who found the course to be challenging made up 72% of the class members.

Adult students were asked to report things they liked about the class. Positive comments were classified into four main categories: independent learning, teacher help, software, and personal progress. Two-thirds of the class reported independent learning, the ability to work at their own pace, to be a beneficial aspect of the course. Having access to teacher help during the class was reported as a positive aspect of the class by 17% of the students. The *Musicware Piano* software was specifically mentioned by 39% of the class as being a favorable program. The review scores and do over commands were important features to 28% of the students. Superior sounds and graphics were mentioned by 6% and good application of combined computer and piano activities was cited by another 6%. Personal progress was expressed as a positive experience of the course by 56% of the class. Half of those citing personal progress related it to music progress in either musical literacy or piano skills gained. The other half cited nonmusical growth such as confidence, positive attitudes, and personal enrichment (in contrast to commitments benefiting their children) as a result of the class.

Students were also asked to list things they did not like about the class. Computer malfunctions, a demanding class schedule, and a lack of personal attention were three areas of frustration for the students taking the piano course. The computer was cited as a problem by 44% of the class. In fact, a computer shut down or loss of scores was experienced by 28% of the class. Another 11% disliked entering answers with the mouse because of wrist problems and the inability to attain the speed required for double clicks. Six percent of the class reported problems with the computer because of no previous computer experience. Scheduling problems were a complaint of 28% of the class. Classes scheduled two times per week represented too heavy of a commitment for 11% of the class while 17% of the class felt the course of eight sessions was too short for beginning students to sustain progress. The final category was cited by 6% of the class who reported not enough individual attention for students when teaching piano class with CAI.

General comments concerning students' overall reaction to the course were obtained through a final open-ended question of the survey. Responses reiterated many of the comments already reported from previous questions. Overall comments were mostly positive (88%). Positive and negative statements were categorized into four general areas: negative, class curriculum and structure, personal benefits, and music education. Criticism of the class made up 11% of the overall comments. Negative feedback focused on the technology associated with the class. One third of the negative responses came from those without much computer background. The remaining negative comments were against the programming errors in the software.

Class curriculum and structure included positive comments on the software, methodology, and environment. Adults reported liking the software and 14% said they planned to purchase the program for continuing piano study at home. The self-paced nature of the class was stated as important to 7% of those responding and 3% regarded on-site help from music teachers to be a positive characteristic to the learning experience. Personal benefits from the course included one-word positive descriptions such as "fantastic" or "great" from 29% of the respondents. Another 14% reported that as a result of experiencing CAI piano lessons they were fully persuaded that one could learn to play the piano as an adult. A remaining 3% stated the course had given them the satisfaction of spending time in an activity that benefited themselves exclusively. The final category, music education, received 18% of the positive comments. Responses were evenly distributed among support for CAI piano lessons as part of the music curriculum in the elementary schools and in creating an interest among parents in their child's school music program.

Discussion

Musical Self-Efficacy

Differences in musical self-efficacy were not found to be

significant among adult students participating in this CAI piano class. However, the design of the Musical Self-Efficacy Scale (MSES) may have included confounding statements when applied to this current study. Both the Basic Skills class (Myers, 1990) and the present CAI class were small samples ($n = 7$ and $N = 18$, respectively) and both classes met for at least six class times. Course content was distinctly different between the groups, however. The Basic Skills class complemented the items covered in the MSES that included a full range of musical activity. Course curriculum included singing, ear training, and movement activities in addition to music reading and performance skills. The CAI piano class covered music reading and performance skills in piano only. Although piano study could influence confidence in a broad range of musical areas, it is probable that the items in the MSES pertaining to singing and listening (i.e., questions 1, 10, 13, 15, 20, 24) confounded the term "music" used in other questions. So, as students were answering items regarding progress or confidence in music study, the students may have overcompensated or weighted their responses based on their ability to sing or participate in a listening activity.

Computer problems may have also confounded results in musical self-efficacy. Several items on the MSES did not specifically refer to music (i.e., questions 5, 12, 16, 17, 19). It can not be determined exactly how students attributed their responses to these questions. Some may have included all aspects of the CAI piano class and music experiences in general. Others may have responded specifically to their interaction with the computer. Responding only to computer self-efficacy for these questions was a distinct possibility since students did ask if I was making the computers malfunction on purpose to see how long they could tolerate the problem before asking for help. The questions from the MSES determining a willingness to expend effort or a willingness to continue under adverse learning conditions seemed to be remembered from the pretest. Although I explained the purpose of the study during the introduction to the course, the adults were curious about my real intentions.

In any case, based on the results of this study, CAI piano lessons alone do not change musical self-efficacy among adult students. Studying only piano did not influence confidence in adults to perform active music tasks in other musical areas such as singing or listening. Distribution of scores was interesting in that the range was almost a mirror image from either side of the median. This is particularly unique because of the small sample. No data from the study give a clear explanation for these results. Perhaps more thorough demographic information, comprehensive data on prior piano and music background, or accurate attendance keeping would have been helpful in interpreting this phenomenon.

Since the present study was structured as a self-paced computer-instruction course rather than a group class, other influences on self-efficacy must be considered. Although the software did give positive reinforcement through verbal approvals and scoring, that type of feedback might have had a different affect on self-efficacy than a personal encounter with a teacher or positive reinforcement from other class members. The human element may be an important factor in developing musical self-efficacy among adult students.

A teacher and a class setting have other influences as well. While individualized programs compel a student to meet their own expectations whether realistic or not, a class of students will follow the pace established by their teacher and will have various ranges of competency represented within the class members themselves. Depending on the personality of the adult student, individualized instruction can bring out a competitive nature to meet one's goals or it could set up a situation for disappointment and feelings of failure.

A final consideration in musical self-efficacy was attendance. Records kept for attendance showed each adult was present for at least six times. Not all students completed their time during the scheduled classes, however. Since parent volunteers and elementary school employees had the opportunity to work at the computers before, after, and during the school day they would take advantage of that time rather than (or in addition to) attending class. Other students requested to stay

for both class hours as computers were available. Due to the independent nature of the course this flexible schedule was not a problem but did make it impossible to log in an exact usage time for each person. The discrepancy in learning time among students may have caused a distorted proportion in self-efficacy scores.

Music Education

Class members had registered for the CAI piano classes because of their interest in piano lessons. Because of a preexisting interest in studying piano, results from the students determining the class to be fun (89%) and challenging (72%) were probable. Adults were told in advance of registration that the course was structured as an independent and computer-assisted class. Based on these results, adult students wanting to try piano lessons under this class format were not disappointed and saw the course as a positive experience.

Students' evaluation of the software produced a discrepancy. Although 72% of the class reported the *Musicware Piano* course as meeting their expectations, only 39% believed the *Musicware Piano* software could help them reach their piano goals. A supposition in this preliminary data could be that adults had low expectations of the class and high piano goals for themselves. Therefore, one aspect of the software's potential was rated high and another low. The survey questions would need to be more complete to determine the exact reason for the differences in ratings.

General comments about the software were positive. Students reported that the sequential steps of the software program took away the threat of learning to play the piano. Participants considered the software to be easy to follow and clearly task analyzed into small steps of progress. Besides developing piano skills, these small steps gave students a sense of accomplishment for being very thorough or complete with their music learning. For example, students were being taught more than just how to read notes on the staff. They were also learning musical terms associated with music liter-

acy such as beat, mezzo forte, or dotted half note. Adults appreciated gaining performance skills but also liked being able to discuss in musical terms what they were doing.

For those who had some piano background, the software did present some initial problems. There was no skills test to identify placement of students with prior piano or musical knowledge. A course outline available from the software manufacturer's web site gave an overview of the curriculum by lesson number, but detailed information was lacking. Advanced placement was also hindered because the order in which skills were presented varied widely from older methods. Since students participating in this course considered themselves to play at a beginning skills level, all participants were encouraged to start with Unit 1, Lesson 1 despite previous training. Starting at the beginning was necessary anyway to learn how to run the software. Once students felt comfortable with the program, those with a piano background were encouraged to skip ahead as necessary. Teachers incorporating software programs with adults at even more advanced levels may need to devise a testing system for placement. Because of varied order of skills presented within different methods, teachers may also want to make a review list of key lessons from the software program in basic music areas. This would give students a reduced and concise overview of skills needed to continue if placed in the later lessons.

Nonmusical benefits of piano lessons in this study were defined as confidence, relaxation, and nostalgia. Many students gained confidence just from succeeding in the commitment to attend class. Others found confidence in learning to use the computer and in growing in personal piano skills. This was evident as the course progressed. Students gradually started trouble-shooting on their own when encountering computer problems and were willing to take bigger risks in advancing through the lessons towards the end of the course. Completing the class increased self-confidence in the ability to learn new things and to pursue additional goals. As a result, some students reported registering for other adult education classes.

Relaxation was both a benefit and a motivator of the class. One night a student attended class and reported having a very stressful day at work. He was encouraged to go home but insisted he would rather sit in class with his headphones on and enjoy the quiet. He sat idle at his lab station for the entire 50 minutes. Being idle during class was an exception, but all students enjoyed the quiet of the room and the isolation of the headphones. Being able to concentrate without interruptions or distractions was in opposition to their daily routine and something they looked forward to. While there are strong arguments for group interaction as a motivator, adults participating in this study placed high value on the individual and quiet learning environment. Educators can offer a balance to the typically hectic and sensory-loaded routine of adults.

Personal enrichment also attributed to relaxation. Parents were especially surprised at the benefits of taking time for themselves through the piano course. They expected family schedules to burst with the addition of piano lessons twice weekly, but instead reported how relaxing it was to focus on themselves and participate in a positive situation. Refraining from strict course outlines and performance goals allowed students to enjoy the process of learning and set their own pace. Adults who missed a class were comfortable returning the next time because there was no pressure to stay up with the class. A specific effort was made to keep the class atmosphere relaxed, and students in this study responded positively to it.

Nostalgia from the course was mostly attributed to the music itself. Each time a user logged on, a random selection of popular tunes would play over their headsets. Memories triggered by the music as well as childhood memories brought back by reviewing music lessons learned long ago brought pleasure to the adult students.

Musical activity in the home did increase for the participants in the study. Specific activities listed were instrumental practice or enrichment music homework from school. If the survey had been given in an interview style, perhaps answers would have been more comprehensive. Students may not have considered concert attendance, radio or stereo listening,

or discussion about the piano class or other music events as "musical activity."

Participation in the class greatly influenced direct parent involvement in their child's music study. Parents taking the class immediately became more involved in their child's music program. One parent volunteered to be a weekly helper in the school music lab. Others found their child's progress scores in the computer to see what their children were doing in the various music software programs. Parents also became curious about their child's music take home papers and even admitted helping their child for the first time in their music homework. One parent enrolled her daughter in private piano lessons after starting the course.

Course Evaluation

Satisfaction with the CAI piano course was mostly attributed to the self-paced curriculum. Adults liked being able to review learning steps and not feel pressure to stay with the class. The program was user-friendly and did not penalize for reviewing or redoing scores. The sophistication of the software kept reviewed lessons challenging by always randomizing drills. Students with prior piano background were glad to be able to skip through previously learned material and progress quickly through the software.

As student self-reliance increased, the need for teacher help diminished. Questions early on in the course requested help running the software, help solving computer malfunctions, or help with musical notation. As the class progressed, the interaction with the teacher moved to questions about the learning process, long-range goals, and how to help their child (or grandchild) get involved in music study. While most students saw this independence as a good thing, it should be noted that some students thought more teacher interaction would be necessary to learn to play the piano. Those teaching courses offering CAI piano lessons would need to monitor student needs and find the best combination of self-paced learning and individualized attention.

Problems with the computers must be anticipated with any CAI class. The lab in this study experienced a constant loss of 17% to 25% of the computers due to malfunctions. There was never an evening where the lab stations were 100% functioning. It should be noted that both the system and the software were new and it was often difficult to determine which was at fault. The school district tech support group members were also delayed in their response to trouble-shooting requests so many problems were not even dealt with for a week or more. The main problems experienced for this class were defective CD drives in the computer hardware and programming errors in the software. Programming errors caused students to lose their log-on point, meaning that when they returned for the next class often the software would not boot up to the next correct lesson in the sequence. Another common programming error was the inability to save scores for certain lessons. Adults were especially frustrated with this since a 0% score on one lesson would noticeably pull down their unit score's average. Other program errors produced incorrect answers for certain lessons. Students motivated by scores were especially upset with these programming problems.

Although musical answers were accepted through the piano keyboards, adults were unable to use the piano keyboards for entering verbal answers. It was not determined if this was a hardware problem or a combination of software and hardware. A mouse click was necessary for all yes, no, go on, and do over responses. This caused hand and arm fatigue for many students. Some adults also had difficulty matching the required double clicks on the mouse. The speed of mouse clicks was adjusted through the computer control panel for those who requested it. Teachers of adult students should take into account the physical problems associated with older learners. Carpal tunnel syndrome, arthritis, and fatigue from computer usage at work make programs that have options other than mouse or typing entry a real plus. Software that accepts verbal commands or piano keyboard entries should be considered.

Several students attending class had little or no computer

background. Courses using computers should have a prerequisite of skills necessary to be competent in the course or offer an introduction class. Students admitted it was very difficult learning to read or play music while also learning computer skills.

Even students with ample computer background found it difficult to maneuver through the course outline to review finished lessons. A simple click on the do over button on every screen allowed immediate review, but to reenter completed lessons the process was more involved. Survey results showed the ability to review lessons was an important feature of the class. The software program would proceed to the next skill with only one set of practice drills as long as the student had a high score. Adults found they needed more practice with new concepts than what was built into the program. If teaching this course again, the steps for reviewing finished lessons should be included on the sheet of basic commands or taught to the group at the beginning of the third or forth class so all students are comfortable with the steps involved in reviewing lessons.

Finding the balance between the time needed to make progress in piano study and the time commitment possible from the adults creates tough scheduling choices. An initial interest survey may be the key to developing a successful program. This class met two times per week due to accommodating the building's availability, the elementary music teacher's personal and professional schedule, and academic deadlines. Each class was 50 minutes in length and met eight times in four weeks. It should be determined if a class meeting once per week would ease time commitments for the students while allowing them to retain skills even though practice between classes would not be probable. The time required to complete lessons varied but the 50-minute class time seemed to be a minimum length for ample progress through the lessons. Since many adults came to both sessions back-to-back a longer class time would certainly be feasible. Length of the course must also be determined. Some class members thought the CAI piano course was too short. Designed as a research project,

the class was limited to the month of September. Future courses may want to extend session length or be prepared to offer the course year round in sessions of 8 to 10 classes. Educators may also want to consider a "user's fee" approach where students pay a monthly rate for unlimited computer time during selected open hours. This idea has great potential when considering the options available through internet instruction.

Conclusion

Results from this study indicate that although musical self-efficacy was not improved as a result of participating in a CAI piano class, adults did consider the course to be a positive experience. Important aspects of the class were the self-paced curriculum and the ability to review lessons as needed. Parents reported that participation in the class greatly increased their interest in their child's musical education. Nonmusical benefits of the class were confidence, relaxation, and nostalgia.

Further research could examine the affects of adults completing a music software program in a classroom versus a home environment. Other studies could determine what correlation exists between (a) skills attained, (b) nonmusical benefits received, and (c) support for music education in the schools as a result of participating in an adult music education course.

Ensuring a future for music education may start with adult education. By focusing on older Americans, music educators are defining music as a lifelong pursuit. Adults participating in musical activity benefit in both musical and nonmusical ways. Their interest and active involvement feeds community interest in music education. A strong K – 12 music program encourages a lifelong commitment to active music participation. The cycle comes full circle as the next generation of adults supports music in the schools. Instead of grafting music into the world of academics through research linking music study to higher math or reading scores, perhaps music educa-

tors should be emphasizing the qualities of musical activity that uniquely benefit participants in all stages of life.

The expressive qualities of music can be enjoyed by actively participating in performing or listening activities at any level of musical accomplishment. There are great rewards to bringing music into the homes and lives of students of all ages. Adults are seeking a balance to the demand of work and busy lifestyles. As Dr. Karl Bruhn, president of the American Music Therapy Association has said, "My sense is that music has something really important to offer older Americans, and it has no side effects" (Tims, 1999). Perhaps adult music education can be another connection in the important bridge between music education and music therapy.

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The Effect of an Introduction to Okinawan Music on Students' Attitudinal Statements Regarding Multicultural Music Education and People from Other Cultures

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The purpose of this study was to determine the effect of authentic traditional Okinawan music instruction on elementary students' attitudes toward multiculturalism and multicultural music classes. A secondary purpose was to document the influence of students' attitude toward multiculturalism when interethnic contact between an Okinawan music teacher and students occurred. Sixty-five elementary school 6th graders from a mainly European American middle-class area participated in this study. They were divided into three groups based on intact general music classes: (a) control group; (b) Group 1, taught by the school's regular music teacher; and (c) Group 2, taught by an Okinawan music teacher. All groups completed both a pretest and a posttest. The independent variable was the presence or absence of Okinawan music instruction, and of an Okinawan music teacher during four 30-minute segments occurring during regular music classes. The dependent variable was a questionnaire consisting of 30 attitudinal statements related to multiculturalism. Results indicated that overall Group 2 showed significantly more positive attitudinal change in their statements than the control group. There were no significant attitudinal changes between Groups 1 and 2. Results of the study reveal the benefits of multicultural music instructions in the music classroom. Results of the subscale analysis indicate that students may experience difficulty in transferring their attitudes toward music to attitudes toward classmates or the multicultural environment.

The United States is one of the most culturally diverse countries in the world because of continuous immigration over the past 200 years. In recent years, many educators in all subject areas have tried to encourage awareness of diversity in America. Multicultural education is a philosophical idea and an educational procedure which underlines this diversity (Grant & Ladson-Billings, 1997). There is discussion over the purpose of multicultural education. However, a common goal of multicultural education, is to develop in children the ability to recognize and appreciate diversity, and to encourage a positive attitude and interactions among people of all cultures. Multicultural education also encourages a way of thinking and acting which ensures equal opportunity for students and exceptional students, as well as students from diverse cultures, social class, racial, and ethnic groups (Banks & Banks, 1993). The American Association of Colleges for Teacher Education (1973) believes cultural pluralism, which emphasizes the value of individual difference in the entire society, should be the basis of multicultural education. In addition, it is very important to develop communication and comprehension skills that lead to awareness of nonnative cultures because of today's technology and media influence events in the United States, and in the international community. Multicultural education addresses these needs.

As one of the approaches to multicultural education, Banks (1994) suggests an intergroup educational approach in which students expand their awareness and positive attitudes toward people from different cultural groups. Many researchers claim that young children may recognize ethnic differences as early as age 3 (King, 1980; Ziegler, 1979). As they increase in age, their awareness will be affected by external factors, and their ethnic preferences will be stabilized by about the age of 11 (Brand, Ruiz & Padilla, 1974; Proshansky, 1966; St. John, 1975; Ziegler, 1979). Young children form their ethnic association and identities through the process of socialization in their home, in the neighborhood, and at school (King, Chipman, & Janzen, 1994). Opportunities to make contact with other people leads children to have positive attitudes and sen-

sitivities toward multicultural interaction. For these reasons, multicultural education starting at an early age is crucial.

Many researchers and music educators support the importance of teaching multicultural music in music classrooms. Almost 30 years ago, Kraus (1967) indicated that teaching music from other cultures helps students develop an interest in different cultures, which lead to open-minded students and the abolishment of prejudice towards difference of nationality or race. As a result of media and technological advances, students are exposed to many different cultures in their real lives, and participation in ethnic musical activities encourages the acquisition of global awareness and tolerance overall (Diaz-Cruz, 1979). Leglar (1992) explains the need for multicultural music education because of global interdependence. In addition, Anderson and Campbell (1996) support multicultural music education because it increases students' exposure to diverse and sophisticated styles of music which leads to increasing students' perception of various musics from the world as well as their own. It also stimulates students' creativity. Music is effective for multicultural music education because it is a multicultural object (Dunbar-Hall, 1992; Elliot, 1989, 1990, 1995). Elliot (1989) explains that music is an artifact that people create or perform which reflects their learned and taught cultural context. Music represents the culture itself which cannot be separated from human activity; it also plays a role in understanding previous social and historical actions and beliefs (Elliot, 1990). Implementation of multicultural music instruction is still, however, in its infancy because there is very little systematic experimental research, which supports such ideas and there is little pedagogical material available to teachers.

Studies indicate that multicultural music education is difficult to implement because of a lack of practical research. Volk's (1991) study of the attitudes of instrumental music teachers toward multicultural music in the music program found that many teachers are open to incorporating world musics in their program, but they are uncertain about *how* to employ them. Multicultural music education of teachers needs

to begin at the undergraduate level (Abeles, Hoffer, & Klotman, 1994; Campbell, 1992; Dunbar-Hall, 1992; Kraus, 1967; Leglar, 1992; Shehan, 1986, 1988). Authenticity of music materials concerning world music is also another critical issue. Sometimes, transcriptions of melodies for school bands and choirs are very removed from their original essence because of pedagogical issues (Campbell, 1992; Hookey, 1994; & Leglar, 1992).

Although there is little research that directly answers the question of the effect of multicultural music education, there are some studies concerning world music preference and attitudes. Familiarity is a critical key for preference for world musics. Shehan (1985) found that elementary students preferred the types of world music they had learned about over other known genres. Nakazawa (1988) found that a greater degree of intercultural interaction leads to a greater preference for music from other cultures; students' experiences affect their preferences. Exposure to other cultures is important because both elementary students and nonmusic major university students preferred music that they had been previously exposed to through listening or performance (Darrow, Haack, & Kuribayashi, 1987; Fung, 1994, 1996; Nakazawa, 1988; Shehan, 1985). Fung (1994) investigated the relationship between world music preference and multicultural attitudes of nonmusic college students and learned that a higher preference for world music correlated with a positive multicultural attitude. This study strongly suggests the effectiveness of music education within multicultural education. Shehan (1981, 1985) suggests early and consistent exposure to various kinds of musical styles because learned attitudes are similar to the acquisition of cognitive skills. It is imperative to study the relationship between world music instruction and students' multicultural attitudes at elementary school levels because students of this age are in the first stage of establishing intercultural awareness.

Many music educators recognize the philosophical importance of multicultural music education. However, many teachers feel they lack expertise. Or, they simply teach world

music the same as western music without any consideration for the cultural context. No studies were found that investigated students' multicultural attitude through world music instruction at the elementary school level. The primary purpose of this study was to examine whether learning music from another culture, specifically Okinawan, affects students' attitudes toward multiethnic awareness in their classroom, social environment, and music classes. The secondary purpose was to determine the difference between instruction by a person from Okinawa and by the regular music teacher who has a cultural background similar to most of the students.

Method

Participants

Sixty-five 6th-graders from one elementary school in a mainly European American middle-class community participated in this study. Subjects were divided into three groups based on their intact general music classes. The researcher assigned these groups to one of three conditions:

1. Pretest/posttest control group ($n = 22$)
2. Pretest/posttest experimental group taught by the school's regular music teacher (Group 1, $n = 21$)
3. Pretest/posttest experimental group taught by an Okinawan instructor (Group 2, $n = 22$)

Pretest/Posttest

The pretest and posttest were researcher-developed. The Multicultural Attitude Survey (MAS) consisted of 30 questions, based on instruments developed by Horne (1977) and Ziegler (1980), as well as four questions written by the researcher. All questions were answered using a 5-point Likert scale which ranged from strongly agree (1) to strongly disagree (5).

The questionnaire was divided into two sections. Section

1 included 17 questions based on the Perception of Social Closeness Scale (Horne, 1977). Originally, this section was designed to measure students' attitudes toward their classmates, addressing interpersonal relationships. In the MAS, students were given a hypothetical situation where they would meet a classmate with a different family background, specifically, Japanese. The students were asked to answer 17 questions about their attitudes toward the classmate. The statements included nine positive questions, and eight questions that implied negative attitudes toward the new classmate.

Section 2 was based on Ziegler's (1980) Preference of Social Diversity. In the MAS, nine questions addressed students' attitudes toward a multiethnic social environment, and four questions, written by the researcher, addressed students' attitudes toward music from other cultures. Questions included bilingual situations in addition to students' family backgrounds. Four statements worded negatively were randomly distributed throughout each section.

A pilot test using 17 fifth-graders and 1 sixth-grader was used to measure the degree of vocabulary comprehension for questions in the MAS. Prior to taking the test, students were asked to circle the line numbers if they did not understand the question. Results indicated that two students had difficulty answering five questions. The pilot test revealed an inconsistency in questions with the phrase "once in a while" (Questions 10 and 14). To avoid misreading in the actual study, the experimenter read aloud all questions when administrating both the pretest and posttest.

Instructional materials

The researcher prepared traditional music from Okinawa, Japan. A *Sanshin* is a lute-like stringed instrument made of wood used to perform and accompany songs in the class and consisting of three nylon strings stretched from the base to the neck of the instrument. The drum of the *Sanshin* is covered in a python's skin. Two songs, "Asadoya Yunta" and "Tinsagu nu Hana", were prepared for singing activities. A world map

and pictures of Okinawa's scenery were also arranged on a blackboard.

Procedure

Instruction and pretest/posttest took place over four regularly scheduled class periods. All sessions were held for 30 minutes as part of a regular general music class. The pretest was administered to the control group during the first session. This group did not receive any instruction about music from Okinawa. After three regular music classes, they took the posttest. Groups 1 and 2 took the pretest during the first session, then they received instruction about music from Okinawa. Group 1 was taught by the school's regular music teacher, and Group 2 was taught by the researcher, an Okinawa instructor. After three Okinawan music classes, all participants completed the posttest. During the Group 1 sessions, the researcher appeared to perform the music examples and *Sanshin* accompaniment, but the regular music teacher provided all the instruction.

The first session consisted of a pretest and informational instruction in geographical facts, history, culture, and classical and folk music. The instructor used a map for geographical identification, pictures of Okinawa related to historical facts, and the researcher's performance to introduce the two types of music to the students.

During the second session, the instructor performed the song, "Asadoya Yunta" with the *Sanshin*. After listening to this song, the instructor and students discussed the structure of the music and the sounds of the instrument. The instructor also showed the students sheet music for the *Sanshin*. The instructor taught "Asadoya Yunta" with only part of the utterances added to maintain the rhythm of the song. At the end of this session, students sang the part along with the instructor's accompaniment. The students were also instructed to dance to this song.

During the third session, after reviewing "Asadoya Yunta," the instructor taught "Tinsagu nu Hana," which was written in

an Okinawan dialect. Students were encouraged to sing this song's original words. The instructor also explained the song's background, the interpretation, and implications. The words were printed in the Roman alphabet, and distributed to the students. The instructor and the students sang the song along with the *Sanshin* accompaniment. Students also danced along with "Asadoya Yunta".

In the final session, the instructor reviewed the information about music from Okinawa, its geographical facts, history, instruments, and the two songs that the students learned. Following the review, the students took the posttest.

Results

Data obtained from the pretest and posttest were analyzed to compare differences between the three groups; (a) the control group; (b) Group 1, taught by the regular music teacher; and (c) Group 2 taught by an Okinawan music teacher. Data for students who did not take one or the other of either the pretest or posttest were excluded from analysis. The scale's reliability was estimated by coefficient alpha, resulting in $\alpha = 0.97$.

The scale used to answer questions was a 5-point Likert scale, ranging from strongly agree (1) to strongly disagree (5). Negatively worded statements in the test were reversed prior

Table 1

Overall Means and Standard Deviations of Pretests and Posttests by Group

Group	Pretest		Posttest	
	M	SD	M	SD
Control	1.94	.59	2.15	.73
Experimental Group 1	1.59	.36	1.60	.51
Experimental Group 2	1.70	.48	1.62	.54

Note: 1 = positive attitude, 5 = negative attitude.

to computation. Thus, the lower mean scores implied students' positive attitudes toward the statements. Pretest and posttest means and standard deviations appear in Table 1.

Posttest means were subjected to a one-way Analysis of Covariance (ANCOVA), with pretest scores used as the covariate (see Table 2). Results reveal a significant difference among the three groups, $F (2, 56) = 3.30, p = .044$.

Table 2

ANCOVA of Posttests by Group with Pretest as Covariate

Source of Variation	SS	df	MS	F	p^*
Covariate Pretest	8.41	1	8.41	38.65	.000
Main Effect Groups	1.44	2	.72	3.30	.044
Explained	12.29	3	4.10	18.83	.000
Residual	12.18	56	.22		
Total	24.47	59	.42		

$^*p < .05.$

Table 3

Holm's Sequential Bonferroni Post Hoc for Adjusted Posttest Overall Mean Scores by Groups

Control Group	Experimental Group 1	Experimental Group 2
2.01	1.72	1.64

Note. 1 = positive attitude, 5 = negative attitude. Underline indicates no significant difference between groups ($p < .025$).

The means of posttest scores adjusted for pretest scores were ordered. As a result of this process, it was learned that the control group had the largest adjusted mean ($M = 2.01$), Group 1 had a smaller adjusted mean ($M = 1.72$), and Group 2

had the smallest adjusted mean ($M = 1.64$). The Holm's Sequential Bonferroni procedure was used to evaluate pairwise differences among the adjusted means. Results reveal a significant difference between the control group and Group 2, but no significant difference between the control group and Group 1 or between Groups 1 and 2 (see Table 3).

Data were divided into three subscales based on students' attitudes toward: (1) a classmate who has a different background, (2) the multicultural environment, and (3) multicultural music classes. Reliability coefficients for each subscale were $\alpha = .96$ for Subscale 1, .85 for Subscale 2, and .83 for Subscale 3.

Table 4

ANCOVA of Posttests by Group with Pretest as Covariate in the Subscale 3 (Music classes)

Source of Variation	SS	df	MS	F	p*
Covariate Pretest	1.54	1	1.54	3.34	.073
Main Effect Groups	9.63	2	4.82	10.46	.000
Explained	13.79	3	4.60	9.98	.000
Residual	25.35	55	.46		
Total	39.14	58	.68		

*$p < .05$.

Table 5

Holm's Sequential Bonferroni Post Hoc for Adjusted Posttest Mean Scores in Subscale 3 by Groups

Control Group	Experimental Group 1	Experimental Group 2
2.18	1.31	1.30

Note. 1 = positive attitude, 5 = negative attitude. Underline indicates no significant difference between groups ($p < .025$).

Posttest means in each subscale were subjected to a one-way ANCOVA with pretest scores used as the covariate. Results indicated a significant difference among the three groups in Subscale 3 regarding students' attitudes toward multicultural music classes, $F(2,55) = 10.45$, $p < .001$ (See Table 4).

The Holm's Sequential Bonferroni procedure revealed a significant difference in the adjusted mean between the control group and the two experimental groups, but not a significant difference between Groups 1 and 2 (see Table 5).

Discussion

Tests for internal consistency showed that the test used was highly reliable for both overall scales and each subscale. Results of this study indicate that Group 2, taught by an Okinawan music teacher, showed significantly greater positive attitude changes in adjusted overall mean scores compared with the control group. Group 1 also showed a more positive attitude change than the control group, although the difference was not significant. There were no significant differences between the two experimental groups. These findings indicate that the two experimental groups showed more positive attitudinal changes than the control group regardless of the teacher's ethnicity. Overall, this indicates the strong effectiveness of multicultural music instruction toward students' attitudinal changes in multicultural statements.

The analysis of each subscale revealed that the two experimental groups showed a significantly positive attitude change toward multicultural music classes compared with the control group. This result indicates that students showed attitudinal change, which is directly related to the independent variable, but they did not transfer their attitude toward the statements about multicultural music to other situations.

In addition to the results of the ANCOVA, findings observed from the pretest and posttest mean scores showed two kinds of possible effects. It is probable that a ceiling effect occurred since pretest means indicated students' positive attitudes toward multiculturalism from the onset. Because of this,

notable differences between pretest and posttest were not ob-
served although there were attitude changes indicated by the
adjusted means between the groups. It was learned that most
students in that specific elementary school had some exposure
to multicultural music, which might have allowed them a
frame of reference for multicultural music, influencing their
positive attitudes from the beginning. For this reason, prior
study should have been implemented to examine the baseline
of students' attitudes toward multiculturalism in order to ex-
pand the preciseness of choices to gain more specific data
about attitudinal change.

The other finding is associated with the control group's
pretest to posttest differences. It is observed that the attitude
of the control group became worse in the posttest mean scores.
This indicates that a pretest effect might have negatively influ-
enced the control group's attitude in the posttest. Also, the
posttest mean scores might have resulted from the control
group's complaint of not receiving the Okinawan music in-
struction. Since the experiment for all three groups was
implemented about the same time, the control group might
have noticed that other two groups were getting music in-
structions from other cultures, and then, they felt they were
left out. Therefore, one could speculate that the lack of attitu-
dinal change for the two experimental groups actually
suggests some attitudinal change in a positive direction.

During this study, one limitation was encountered. The
setting of the Group 1 did not appear to be completely con-
trolled because an Okinawan music teacher performed the
music examples and musical accompaniment. This may have
influenced the results of students' attitudinal changes. Results
could have been different if the nonnative teacher had played
the authentic music.

Conclusions and Implications

Results suggest that multicultural music instruction may
change students' multicultural attitudes positively. The results
also imply that authentic music instruction is advantageous

when music from other cultures is taught, particularly when the teacher's ethnic background is different. Findings were consistent with the common principles of multicultural education: to help students expand their awareness and positive attitudes toward people from different cultural groups (Banks, 1994).

Results also revealed that students' attitudes may change even after a short length of treatment, which contradicts a common belief that attitude change requires lengthy treatment. This is of special importance, given the limited time for a music curriculum in many schools.

Analysis of the three subscales suggests the difficulty of transferring students' attitudes toward music to other areas such as attitude towards their classmate or the environment. In other words, this study did not provide conclusive results as to the effect of multicultural music beyond the multicultural music classroom.

Recommendations

The findings of this study suggest several ideas for future research. The study should be replicated in other elementary schools, grades, or regions. Also, previous exposure to multicultural music should be considered. The study only tested the immediate effect of one world music instruction unit on attitude change and this could possibly change after a few weeks. Therefore, further research is needed to test the retention effect of multicultural music instruction. Techniques for a broader application of music instruction and music selection should also be investigated. Future research should include the development of a measurement scale, which could more precisely pinpoint the relationship between students' attitudes towards multiculturalism in general and multicultural music instruction specifically.

This attitudinal study could lead to further studies that examine visible behavior changes when specific attitudes are expressed. As Ziegler (1980) stated, attitudes are only one way to determine behavior. It does not necessarily mean that

multicultural attitudes directly apply to students' actual behavior. Therefore, it is recommended that further research continue with regard to the effectiveness of multicultural music education for students' attitudes toward multiculturalism which may, in turn, influence behavior beyond the classroom.

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The Effect of Instruction on a Modified Song Flute and Vocalization on Pitch-Matching Ability of an Eleven-Year-Old with a Moderate Intellectual Disability

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The purpose of this case study was to determine if the vocal pitch-matching skills of a child with a moderate intellectual disability could improve through training, utilizing a modified-song flute. The modified song flute was used for the purpose of replicating a pitch model in the subject's singing range. Training involved learning how to sound 3 notes and 3-note melodies on the modified song flute and matching pitch through vocalization. Treatment sessions were given once per week for 10 weeks. Results of the pretest and posttest were analyzed using the Wilcoxon Matched-Pairs Signed-Ranks Test showing a significant difference in greater pitch discrimination ability as a result of training. The subject's improvement can be seen in comparing the pretest performance, matching 4 pitches of 87, to the posttest performance, matching 19 pitches of 87.

Singing is often a vital part of music therapy sessions since it is most always available to the client as is clapping and body percussion for responding to music in therapy. It has been observed, among elementary special education classes comprised of students with moderate and severe intellectual disabilities, that ability to sing and ability to match pitch are very limited. Among studies investigating vocal range and pitch-matching ability, Larson (1977) found the mean vocal range of children (7 and 8 years old), who are in the educable

mentally retarded range, to be significantly lower than the normal group. Sato (1960) found vocal ranges lower and more severely limited for children with cerebral palsy as well. Knowing this tendency, a music therapist or music educator should consider adapting music to be sung by children in special education populations, to be in a lower, more comfortable range.

Dileo (1976) compared singing ability and pitch ranges of institutionalized persons with mental retardation to variables of age, sex, race, IQ, diagnosis, adaptive behavior level, articulation, proficiency, and language level. Although pitch-matching difficulty was revealed, he found no significant relationship between degree of disability and pitch-matching ability. Dileo did find a relationship between those variables in persons with mental retardation to lower singing ranges, as was previously noted. Myers (1985) investigated the relationship between age, vocal range, vocal range midpoint and pitch-matching ability of subjects with mental retardation and subjects with psychiatric disorders. Unlike the findings of Dileo, a significant relationship was found between the degree of disability (IQ level) and pitch matching ability among the subjects with mental retardation. Myers found no significant relationship between the variable of age and vocal range.

Grant and Share (1985) investigated the pitch discrimination skills of a group of students with mental retardation through exercises presented within, below, and above their vocal ranges. An unexpected finding revealed pitch discrimination to be better in the range above their vocal range with higher scores in the high frequency category. This significant difference between the below and above responses was unexpected since an earlier study by Grant (1977) indicated, as did other studies mentioned above, that vocal ranges in this population are pitched lower than the norm. It had been assumed that better pitch discrimination ability would not be found above their vocal range but within and below their vocal range. The study may indicate further evidence that auditory discrimination involving pitch is a problem for this population, whether from lack of training or lack of acuity in discrimina-

tion.

A further complication arises for the male music therapist or music specialist who is the vocal role model for elementary school children and those younger involved with either regular or special education populations. In *The Orff Echo* (see Spalding, 1991), Spalding comments and relates others findings and solutions to the problem of the male vocal role model. Jeff Kriske, a male vocal teacher of elementary school children, has encountered some problems as a vocal role model and states, "It is difficult, especially for some younger children (K-1) to displace the octave they are hearing" (Spalding, 1991, p. 5). A number of alternatives have been tried. Kriske uses children who can match him to act as "translators," who in turn sing in the range (or octave) of the students. Other solutions that Kriske and other male music educators use to model pitch include the use of the glockenspiel, alto xylophone, piano, small electronic piano, violin, singing falsetto, and the use of soprano and alto recorder. Robert Defrece, who uses his falsetto voice in elementary music, also uses the alto recorder as a model. He states "the 'flutey' quality of the recorder provides a good model I like the children to imitate" (p. 6). Defrece also uses a small electronic keyboard (see Spalding, 1991).

The purpose of this study was to determine if the vocal pitch-matching skills of a child with a moderate intellectual disability can improve from the process of learning to play a modified-song flute. The instrument provides a pitch model which is the same or above the range of the child. This was chosen because the experimenter is male and because the recorder differs from the male vocal model, which lies an octave below that of the child. This pitch model would be satisfactory according to research by Grant and Share (1985).

Suitability of the song flute for this study and for an 11-year-old fourth grade elementary student with a moderate intellectual disability include the following factors: (a) oral musculature, lip closure, and oral position of light exertion; (b) no assembly and little maintenance; (c) easy transport and low cost; (d) minimal muscle strength of fingers; and (e) size and

weight of instrument.

More challenging factors include the following: (a) the need for fine motor/mobility including finger dexterity and movement of joints of fingers; (b) the need for stable capacity, or holding up or supporting the instrument involving the neck, right thumb, support of shoulders, elbows and wrists, and (c) using the correct amount of air being (light to moderate exertion) with the proper formation of the oral cavity (Elliot, 1983).

The secondary intention of this study of the song flute was to provide a basis for the student to be able to further develop instrumental skills and independent music skills suitable for leisure time or community-based activities in the future. DiGiammarino (1990) studied and compared the number of functional music skills with the personal variables of sex, severity of problem behavior, level of mental retardation, and site of residence. She found the number of functional music skills was significantly related to level of mental retardation and site of residence. The goal of independent music skills for leisure time activity falls within the criterion of 'ultimate functioning' articulated by Coates (1987). The study of the song flute together with vocal pitch matching involves a number of skills related to functional leisure skills, which, according to DiGiammarino (1994) should include both listening and performance skills, and both higher functioning and lower functioning skills. The study of the song flute, together with pitch-matching exercises, can involve a number higher functioning skills, such as singing or playing a recognizable song or tune by themselves, in unison with others, or in harmony with others.

The primary purpose of this study was to test whether or not there would be a statistically significant difference in the pitch-matching ability of the subject after training involving a modified song flute and vocalization in pitch-matching exercises.

Method

Subject

An 11-year-old, fourth-grade girl with a moderate intellectual disability (MOID) was chosen to participate in the study. Test evaluations of the subject showed IQ scores between 40-60. The student's Individual Education Plan (IEP) gave her primary classification to be intellectual disabilities (MOID) with a secondary classification being speech impairment (IEP, 2-7-97). IEP goals included motor development (i.e., participate in rhythm, movement, and locomotion activities) as well as using leisure time appropriately. The IEP allotted 1 hour for music therapy weekly.

The subject has Spondlasiviousas, a condition of the joints or vertebra, which did not pose a problem in playing the song flute. This condition was not believed to be related to the cause of the student's intellectual disability. The subject was a student at a county-wide, public-school, special-education program where she received music therapy twice a week. The student was one of the higher-functioning students in the moderate to profound segment of the special-education program being served by music therapists. She was pleasant and had good communication and language skills. It was observed that she learned words and rhythms to songs well but was very poor with matching or maintaining the proper pitch. The subject was asked to participate in the study and permission was sought from the classroom teacher and parent.

Apparatus

Instruments used for the study included two Conn song flutes. A tape recorder and small Casio electronic keyboard were used during the pretest and posttest.

Procedure

A pretest was given prior to the first session involving in-
struction on the modified song flute. The pretest or 'Pitch-
Matching Exam' included 10 exercises made up of two, three,
and four note sequences. The exercises, which were Orff-like
in nature, using a pentatonic scale, were arranged from simple
to more complex and spanned a range from middle C to A
above, being within the range of a major sixth. This range
approximated the subject's range. The subject's vocal range
tested from A below middle C to A above middle C. The
lowest note on the pitch-matching exam was middle C, coin-
ciding with the lowest note on the song flute (C).

The test was administered to the subject by a male vocal
model singing falsetto while at the same time playing a Casio
electronic keyboard in the same register. Each exercise was
repeated three times (as was done by Grant & Share, 1985) by
the music therapist singing with the keyboard. The subject
repeated each exercise alone, vocalizing a 'la' syllable with no
keyboard reinforcement after each repetition by the music
therapist, and was recorded on cassette tape.

Treatment sessions were arranged once per week over a
10-week period. Sessions began with instruction directed to-
ward holding (hand positions and finger placement), lip
formation on, and blowing the song flute. Although the song
flute was chosen over the traditional recorder for its greater
ease in playability (i.e., smaller, raised tone holes and easier
tone production in blowing), it was revealed in the first two
sessions that even the song flute would be too great of a chal-
lenge. The subject had difficulty in covering the tone holes
completely especially the thumb hole, which was out of sight
of the subject. This inability was not due to physical limita-
tions of the subject but to mental limitations or mental
perception. Task analysis revealed the need for further adap-
tations to be made to the song flute by taping over all but the
lowest two tone holes, thereby leaving the bottom two tone
holes open. This adaptation left the now modified song flute
with three remaining notes. Covering none of the remaining

tone holes would produce an E. Covering the next tone hole left uncovered by the tape with the right hand forefinger would produce a D, and adding and covering the lowest tone hole by using the middle finger of the right hand would produce a C. These three notes would lie within the middle of the subject's range (displaced up by 1 octave).

Sessions continued on the modified-song flute as the subject learned to finger each note, play each note, and match pitch by vocalizing 'la' for each note. Sessions progressed to three-note songs including the first phrase to *Three Blind Mice* and a three-pitch version of *Mary Had a Little Lamb*. Vocalizations now included the words of the songs. Vocalizations became more successful than recorder performance. The words now gave a more concrete understanding to covering the correct tone hole (E = Three, D = Blind, C = Mice). At the end of the 10-week period the pitch-matching test was administered again and recorded on tape.

Results and Discussion

The results of the pretest revealed the subject matched four pitches from 87 pitches, or 4.6% of the pitches presented. The subject matched 19 pitches from a total of 87 pitches on the posttest, matching 16.5% of the pitches given (see Table 1).

To analyze and compare the results of the 10 exercises of the posttest and pretest, the Wilcoxon Matched-Pairs Signed-Ranks Test was utilized. At a significance level of $\alpha = .05$, the tabled value equaled 8. The obtained t value was 1. Results may indicate a significant improvement in pitch-matching ability as a result of training.

Upon closer inspection of the data it was observed that the subject matched the following pitches on the posttest: C (12 times), D (5 times), and E (1 time) and G (1 time). The pitches matched on the pretest were C (3 times) and A (1 time). The most pitch-matching improvement was with pitches C and D. This would appear to be a result of the training with the song flute utilizing pitches C, D, and E. It may be deduced from the results that without exercises and

Table 1

Data Collected: Number of Correctly Matched Pitches

Exercise #	Pretest	Posttest
1.	0	5
2.	0	3
3.	0	0
4.	0	3
5.	0	0
6.	2	1
7.	0	1
8.	2	3
9.	0	0
10.	0	3
Total	4	19

Note: Pitches matches in pretest: C = 3 , A = 1; pitches matched in posttest: C = 12, D = 5, E = 1, G = 1.

training on other pitches, which were not matched in testing, there would be little improvement with the other pitches and there would be little transfer in ability to match pitch on notes not included in training.

Another reason for greater success in matching the pitch of certain notes (C, D) may be because they lie within the subject's singing range. Better posttest results may also be attributed to the test being administered more effectively by the music therapist intern the second time. Improved results might also be attributed to the student learning to take the test and adjustments to working with the music therapist (i.e., being more acclimated to the therapist's voice and routines). It should be noted that the close attention paid to the music therapist's mouth during the modeling of *Mary Had a Little Lamb* and the correct memorization and reciting of the song revealed the excellent treatment and learning the subject re-

ceived from her speech therapist, as well as the excellent one-on-one learning skills, which benefited this study.

Conclusions

This study may, in part, answer the questions posed by Grant and Share (1985) as to whether 'lack of training' was a factor in poor pitch-matching ability or if training could improve the pitch-match ability of subjects that are intellectually disabled. Caution should be taken, however, in generalizing the results of this single case study. Future studies could test these results by using a greater number of subjects. This study suggests training may improve pitch-matching ability in the intellectually disabled, as it may with the general population, even though the intellectually disabled face greater challenges. This study did not compare pitch-matching ability of special education populations with regular education populations but only was done to measure improvement of pitch-matching ability of a student with intellectual disabilities when training is administered. The study might also suggest that using a pitch model in the subject's range or higher, such as that of a song flute or the recorder, is an effective method of providing a discernible pitch model to the young student. It should be noted that the subject attended regular music therapy sessions twice a week, (in addition to the once-a-week treatment) throughout the study and that certain activities were included which addressed pitch. This may have been a factor in some improvement of pitch-matching ability.

A secondary purpose of this study was to lay the foundation for learning to play the song flute, recorder or other instrument in order to develop independent music skills suitable for leisure time activities. By the subject's first learning some fundamentals of playing this instrument and learning to sound and play three notes, it was hoped that this experience would lay a foundation to interest the subject to later pursue music in this area. Although some music skills were developed, the development of instrumental music skills was not significant. It appeared that the cognitive and motor chal-

lenges of learning to play the song flute might have been somewhat overwhelming for this subject. Perhaps a strategy of instruction that would involve a classroom teacher or a parent in the instruction and in a daily practice routine would prove to be more successful. That type of support is not always prevalent in the families of children who face the challenges of living with disabilities. It may prove to be of greater benefit for the student at this age and at this level of intellectual development to participate in other music activities such as singing, rhythm activities, and movement activities. The results of DiGiammarino's 1990 study "indicated that the number of functional music skills was significantly related to the level of mental retardation . . . with the number of music skills decreasing as the severity of mental retardation increased." Although positive results were obtained in the improvement of pitch matching through instruction on a modified song flute and vocalization, future studies could compare whether instrumental instruction is more suited to the mildly intellectually disabled if the goal is independent, functional musicianship.

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An Investigation of Music and Nonmusic Majors' Responses to Musical Tension and Dynamics in Beethoven's *Symphony No. 7*

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In this study of musical response, participants (N = 48) were given different listening tasks, and were asked to respond to a recording of music while using a Continuous Response Digital Interface (CRDI). Participants were divided into two groups and listened to the same musical selection, Beethoven's Symphony No. 7, Movement 2. *Nonmusic majors (n = 36), were enrolled in a music methods course for elementary education majors, and were asked to respond to "musical tension." Music majors (n = 12), were enrolled in undergraduate music core curriculum classes, and were asked to respond to "dynamics." Results indicate similar tendencies among participants within groups, and responses between groups were extremely similar, despite differences in listening task orientation. Composite graphic analysis of CRDI data demonstrates considerable variability throughout the excerpts, with a number of "sectional" response patterns appearing which appear to correspond with changes in dynamics. Comparison of the two groups' mean subject responses suggests these contrasts in dynamics may have had a considerable effect on Group A participants' responses to "musical tension."*

Introduction

At present, the development of a broad range of skills and understandings is emphasized in schools and in teacher education programs due to the recent publication in the U.S. of National Standards in Music (1994). Of the nine published "standards," three specific areas relate to this study: (a) listening, analyzing, and describing, (b) evaluating, and (c)

understanding how music relates to other fields. These areas have been suggested by Reimer (1995) as vehicles for teaching beyond one of the "traditional goals" of trying to make all people performing musicians. The broad acceptance of these recommended goals is evidenced by the inclusion of listening lessons in many teaching method books, videotapes and multimedia programs, as well as the use of similar strategies and accompanying activities that are often utilized in secondary and college-level music and music appreciation courses. Exploring how effective these strategies may be was the intention of this study, which examined responses of university music majors and non-music majors during individual listening sessions to one movement of an early 19th century symphony by Beethoven. The initial impetus for the study was based upon the outcomes of a pilot study that suggested nonmusic majors focused considerably on dynamic contour when asked to identify and respond to tension. While recognizing that tension and dynamics may be related in many musical works, utilizing music majors' responses when asked to identify only dynamics would seem to provide accurate data for comparison.

Related Literature

Listening experiences would seem to have a considerable effect on musical learning and internalized responses to music. A widely accepted goal of college level music appreciation and various nonmajor music courses is the advancement of students' recognition and enthusiasm for diverse styles of music through listening experiences. Listening, or "attending" to music has long been suggested as a prerequisite to more advanced affective understanding and responses (Krathwohl, Bloom, & Masia, 1964). Advanced levels of appreciation through listening would, therefore, require a fundamental ability to attend to various musical elements or concepts. Thus, while receiving or attending is a "first level" goal, developing further awareness and appreciation would seem to depend upon a basic understanding of fundamental listening skills, cultural and historical perspective, and a working

knowledge of musical concepts.   Appreciation that reaches an emotional level may be described as having moved through a cognitive stage (Sloboda, 1985) that requires more abstract thought than simply attending.

Observing and analyzing reactions to music is a primary means for examining musical response. Research studies have examined a variety of theories, influences, and indicators related to response (Brown, 1978; Geringer & Madsen, 1987; LeBlanc, 1981; Madsen, 1997; Price & Swanson, 1990; Shehan, 1985; Sims, 1987). A number of studies have also been undertaken regarding the understanding of musical concepts (Blocher, Greenwood, & Shellahamer, 1998; Denardo & Kantorski, 1995; Garofalo & Whaley, 1979; Greer & Lundquist, 1976; Jetter & Wolff, 1985), although implications of this body of research regarding the effect of concept instruction upon musical response appears to be inconclusive. Bharucha (1994) suggests that knowledge of musical "standard" practice allows for a higher level of discrimination between compositional techniques, resulting in heightened expectations during a work. Campbell (1991) submits that the ability to process information influences preference, with less experienced listeners attending to individual components or concepts of a musical selection (e.g., rhythm), while more experienced listeners are able to process more complex information.

Some research suggests previous experience and education in the arts may make a difference regarding response to music (Abeles, Hoffer, & Klotman, 1992). The aesthetic experience involving music appears to be a nearly universal phenomena, and has been increasingly studied by aestheticians, researchers, psychologists, and educators in this century (Kneiter, 1971). Sloboda (1985) suggests that a problem with most music listening is that no record or "recoverable traces" exist after the listening session (p. 151). Recent studies (Lychner, 1999; Madsen, Brittin, & Caperella-Sheldon, 1993; Madsen, Byrnes, Capperella-Sheldon, & Brittin, 1993; Madsen & Fredrickson, 1993; Misenhelter & Lychner, 1997) in this area have utilized applications of computer assisted data collection

technology in an attempt to quantitatively analyze the music listening experience over time. Aiello (1994) expressed concern that the difficulty may lie in "designing an experiment that investigates what may occur while listening to an actual musical composition" (p. 275).

The listening experience is clearly a temporally experienced event, and the Continuous Response Digital Interface (CRDI) was designed to record data concurrently as participants respond to musical stimuli. The wide variety of response studies undertaken with the CRDI would suggest that its manipulation in descriptive responses to musical stimuli is not problematic. Subject response is registered via the manipulation of a dial, as the CRDI provides a negative/positive continuum over a 255 degree arc. This device has been shown to reliably measure perceptual responses to a variety of musical stimuli, including tempo (Sheldon, 1994), loudness (Geringer, 1995), intonation (Madsen, Geringer, & Heller, 1991), and focus of attention (Madsen & Geringer, 1990).

Focus of attention — the ability of participants to distinguish between perceived musical elements while concurrently reporting response — is perhaps a particularly problematic issue in collecting information about listening experience. Robert Frances (1988), discussing results in a number of experiments in the area of aesthetics and meaning in music, noted that "additional difficulty arises in this analysis because it results in the separation of aspects that are united in the work" (p. 298). Madsen (1997) suggested that the utilization of the CRDI may actually keep people on-task to musical elements for an extended period of time. In this regard, the multiple tasking of forced reporting (continuous dial response) while listening may be seen as a desirable artifact of this particular methodology — requiring that people stay on task to music for an extended period of time precisely because they are manipulating a dial.

A recent development in this line of research has been the examination of "tension" as perceived by listeners. Initial investigation by Nielsen (1983) used a pair of "tongs" and a computer interface, which recorded data whenever participants

applied pressure in response to perceived tension. Madsen and Fredrickson (1993) successfully replicated Nielsen's study using the Continuous Response Digital Interface (CRDI) rather than the tongs. Fredrickson (1995) compared university level students' responses of "aesthetic" responsiveness to perceived tension using Haydn's *Symphony No. 104* with results indicating a possible relationship between perceived tension and aesthetic response in the musician participants. Using the same musical stimulus, Fredrickson (1997) compared elementary, middle, and high school populations, with results demonstrating strong similarities in timing and magnitude of listener responses. It was noted in this study that younger participants seemed more willing to use the full range of dial movement, while older and more musically experienced participants tended to be more conservative. Fredrickson (1999) has also studied musicians' perceptions of tension with and without the in-depth exposure achieved through rehearsal. No differences were noted between those responding with the rehearsal background as compared to respondents with only recorded aural stimulus.

McDonald (1998) compared perceived musical tension, asking participants to respond to "perceived musical tension" while listening to recordings of live performances and a synthesized performance recording, which also controlled for changes in tempo and dynamics. As in previous studies regarding tension, no explicit definition of the term was provided for subjects. Participants demonstrated higher response levels as indicated by corresponding dial movement to tension in the synthesized recordings. Results also indicated strong correlations among participants' responses to succeeding phrases in the live recordings — each phrase modulating one step higher — with participants responses also showing an increase in perceived tension. Cause and effect relationships in regard to perceived tension remain unclear, this despite attempts to link musical elements and perceived tension in a number of studies (Nielsen, 1983; Madsen & Fredrickson, 1993; Fredrickson 1995).

Procedure

In this study, two groups were asked to respond to the same selection of music. Participants ($N = 48$) were enrolled at one of two comprehensive state universities in the Southeast, and listened / responded concurrently to selected excerpts from Ludwig Van Beethoven's *Symphony No. 7, Movement 2*. Total length of the selected listening example was 9'5". The primary research problem of this study was identified based on the preliminary observation that nonmusic majors seemed to focus on dynamic contour, while being "assigned" the task of listening for tension in the music.

Neither group received any information about the musical stimuli prior to the listening or "response" session. Participants in Group A ($n = 36$) were asked to manipulate the CRDI dial (more — less) indicating their response to "musical tension" while Group B ($n = 12$) received instructions requesting a response specific to "dynamics," with a dial overlay which also read simply "more — less." Small studios with four CRDI listening stations served as a laboratory for each phase of this study. Each station included a response dial and a written packet that provided instructions and a space for written responses. There was no interaction with or among participants during the running of the stimulus. A desk-top computer was used to collect and compile data from the four CRDI dials, in concert with an 8-bit analog to digital converter. Data were compiled with a series of statistical programs written specifically for the CRDI (Kawaguchi & Gregory, 1994). Summary (group mean) data were subsequently charted graphically to demonstrate response data over time.

Results

Mean response data were compared between the two groups via Pearson Product-moment correlations, with a resulting positive correlation of $r = .79$. This strong positive correlation further supports the relationship between the

groups responses, despite clearly differentiated response orientation.

Response data from the CRDI, drawn upon responses to the entire musical selection "over time" were further adapted for graphic analysis. The composite (group mean) graph of CRDI data (see Figure 1) merged from both groups — Group A, who was asked to respond to "tension" and Group B, who was asked to respond to "dynamics" — demonstrates considerable variability throughout the excerpts. Of considerable interest in the data graphic analysis, however, is the extreme similarity between the groups' responses despite differentiated listening tasks.

Discussion

A unique dynamic "mapping" of the Beethoven recording may be evidenced by examining the reasonably predictable graphic representation of the music majors' responses to represent increases and decreases in dynamic contrasts. Curiously, it would seem the response patterns of the nonmajor participants (who were asked to respond specifically to "tension") are nonetheless almost identical to the *dynamic* peaks and valleys in the stimulus recording (i.e., nonmajors' idea of tension matches majors' perception of dynamics). These results are similar to response patterns to "dynamics" cited in a study by Madsen (1997), which found the highest correlation between dynamics / aesthetic response, and melodic / aesthetic response.

Despite the strong correlation between dynamic and tension responses in this limited study, caution seems advisable in assuming causality. Experience, terminology, and reliable measurement of individual responses to musical stimuli are potentially problematic in this line of research. An obvious difficulty would seem to be the defining of tension in music, particularly for the less experienced listener. Lychner (1999), while investigation terminology relating to the terms aesthetic, felt emotion, and perceived tension, utilized a "free response" control group (no instructions were provided regarding termi-
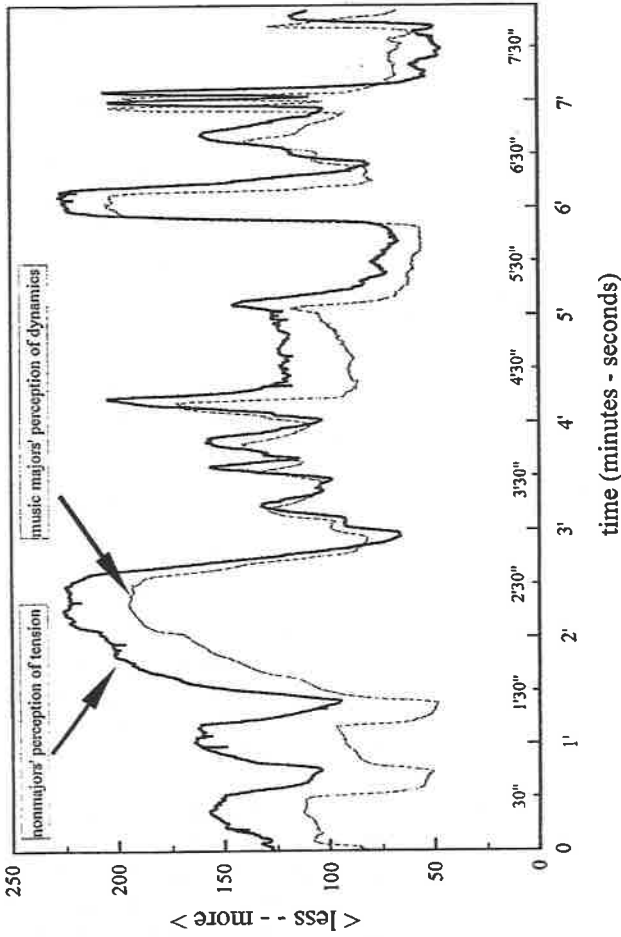
Figure 1. Combined response data.

nology). Results indicated the vast majority of participants indicated having had one or more "aesthetic experiences" according to their own definition, with similar responses among participants at corresponding musical events. It would seem that with nonmusic majors in particular, a common vocabulary that is an assumption among musicians may be conspicuously absent.

The investigation of tension in music would also seem to have obvious implications regarding the notion of "function" (e.g., the transformation not only of larger compositional concepts [dynamics, tempo, etc.], but also of musical material which generates changes in affect [stability, instability, tension, repose] often through concurrent changes in structure (statement, counter melody, transition, development). It may be that listeners tend to focus more readily on the uppermost part of a musical texture (Brofsky & Bamberger, 1969), a registration in which the melodic material is commonly found. Tension, it would seem, could also be readily perceived when the melody is moved into one of the lower voices (as is the case with the cello and bass voicing in this symphony movement by Beethoven), thus giving the part more of a foreground role. A large scale symphonic work uses a myriad of compositional possibilities to "increase" tension, including of course dynamics, although listeners may be less aware of concomitant compositional devices such as repetition and textural changes. Function of texture and dissonance have also been noted as a likely influence on participants (Misenhelter & Price, 1998) responding to more contemporary literature.

It would appear that music may be able to "move" listeners in a unique and similar way regardless of performance variables. Experienced listeners and musicians doubtless have a more cognitive relationship with musical listening experiences, perhaps particularly when a situation involves repeated listenings. It may not be all that surprising that nonmusicians or less experienced listeners associate functional developments such as tension with those elements or concepts that they can identify — tempo and dynamics being two that are particularly accessible. Potential studies to isolate elements,

and listener responses to these elements, might find participants tracking each element individually and consecutively. A graphic post-hoc comparison to examine similarities and differences may provide considerable insight to response patterns. An additional area of related research may be the effect of dynamic range on tension in speech. Similar investigations could pursue repetition and silence in communication research. Continued research is recommended, and may be most beneficial if comparative studies between experienced and inexperienced listeners are developed that examine how students perceive and react to distinct musical elements to further enrich their understanding and enjoyment of music.

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Improving the Educational Environment:
Music, Snacks, And Mathematic Achievement

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July 2001
Committee Chairperson: Norma McClelland

Thesis Abstract

The purpose of this study was to measure how much classroom environment would influence mathematic achievement. Students took the test in three groups: with snacks, drinks, and music during the testing period; with snacks, drinks, and music for 5 weeks ending with the testing period; and without snacks, drinks, and music during the testing period. The control group received the treatment at the end of the testing period as a reward for participating and taking the test seriously.

All three classes of students improved over the test scores of the previous year. The class that experienced the treatment only during the testing period improved over the previous year, but the improvement was not significant. The group that had the treatment for a total of 5 weeks finished with a narrow range of scores and significant improvement at the $p < .05$ level. The control group scored significantly higher ($p < .05$) than the previous year as well.

Results are in terms of a practical, school atmosphere. Further research may determine which part of the treatment effected the mathematical achievement.

The Impact of Public School Music Programs on Lifelong Music Participation

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Thesis Abstract

The ultimate goal of music education should be the preparation of students for lifelong music participation. To assess whether or not music education is meeting this goal, feedback must be obtained from those who have experienced a public school music education to determine its effectiveness.

A study of musically active adults and their experiences with public school music education revealed these trends. Of the surveyed participants, 96% had elementary music, 95% had junior high music, and 93% had high school music. Some 83% had private instruction and 85% participated in nonschool musical activities. Only 17% mentioned negative experiences, while 54% noted positive school music experiences, and 11% reported both positive and negative experiences.

High school teachers were named by 41% of the participants as most influential in shaping their musical attitudes and careers. Family influence was next (37%), followed by church choir directors (27%), private instructors (26%), junior high teachers (20%), and elementary teachers (16%).

Teachers were listed most often on both the positive and negative experience lists. Other positive factors were personal benefits, i.e., self-esteem, enjoyment, fun, friendships, and discipline. Other negative experiences included scheduling restraints, lack of advanced curriculum, over-crowded programs, and not enough individualized feedback.

Transition from school choral programs to adult choral programs appears relatively successful. Instrumental school programs are not as successful in producing lifelong instrumentalists.

The Effect of Conductor Gesture on Inappropriate Vocal Tension in Individual Singers

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May 2001
Committee Chairperson: William Fredrickson

Dissertation Abstract

The primary purpose of this study was to examine the effect of left hand conducting gesture on inappropriate vocal tension in singers. This was accomplished by having singers ($N = 103$) from three populations, of varying levels of expertise, perform a musical selection. During their performance, subjects watched a videotaped example of a conductor using a variety of left-hand conducting gestures. Specifically, six left hand conducting conditions were examined including: (a) left hand, no change; (b) left hand, fisted gesture; (c) left hand, palm up; (d) left hand, palm down; (e) left hand, stabbing gesture; and (f) left hand, sideways, phrase-shaping gesture. Each example contained control measures, with only the right hand maintaining a steady beat pattern, and experimental measures, including the right hand beat pattern and the various left hand conducting conditions.

Results showed that there were significant differences in vocal tension ratings for all conducting conditions except the palm down condition. Of the remaining conducting conditions, the fisted gesture and stabbing gesture generated the highest t-ratios. Post hoc analysis of tension responses of 30 singers with the highest mean difference scores was carried out by the investigator using the Continuous Response Digital Interface (CRDI) system. Results showed that the general shape of the data stream was similar for all conducting conditions with a plateau effect during the control measures and a varying increase in inappropriate vocal tension levels for the experimental measures. No significant differences in inappropriate vocal tension levels were found among college singers, conductors, and high school singers or among male and female singers. In addition, no significant differences were found due to the ordering of examples.

Judges indicated their reasons for high inappropriate vocal tension ratings by circling perceived characteristics of tension on an evaluation sheet. Most frequently cited were visible characteristics manifested by tension in the face, jaw, neck, and shoulders. Audible characteristics included fluctuation in intonation, difficulty executing higher pitches, and harsh tone quality. Evidence of tension in one muscle group was almost always coupled with evidence of tension in another group, indicating that tension may have a domino effect for the singer.

Effects of Practice Strategies on Improvement of Performance of Intermediate Woodwind Instrumentalists

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July 2001
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Dissertation Abstract

The purpose of this investigation was to examine the effects of different practice strategies by intermediate woodwind players on the improvement of performance of an etude. Improvement of performance was defined as improvement in note accuracy, rhythm accuracy, articulation accuracy, consistency of tempo, and the adherence to a metronome.

Participants were 7th grade students who had been studying their instruments for 2.5 years at the time of the testing ($N = 80$). They were randomly assigned to one of five practice groups. After sight-reading a musical etude, participants practiced using the assigned practice strategy, either playing with a gradually increasing practice tempo, playing with a consistent practice tempo, silently fingering with a gradually increasing practice tempo, silently fingering with a consistent practice tempo, or free practice. Following the brief practice session, the participants again performed the etude.

Results revealed no significant differences among the practice strategies for rhythm accuracy, articulation accuracy, consistency of tempo, and adherence to the metronome. Analyses indicated a significant difference among practice strategies for note accuracy. A post hoc comparison indicated that the playing with a gradually increasing practice tempo strategy was more effective than the silently fingering with a gradually increasing practice tempo strategy in playing the correct notes. Further, the free practice strategy was more effective than playing with a consistent practice tempo, silently fingering with a gradually increasing practice tempo, and silently fingering with a consistent practice tempo strategies in playing the correct notes. There were no significant differences between the pretest and posttest. There were no significant interactions between practice strategy and pretest/posttest.

These results suggest that, in a brief practice session, intermediate woodwind students needed to hear the physical sounds of their instruments in order to play the correct notes. Simply fingering the notes without producing the sounds did not help students play the correct notes. Because free practice was a significantly more effective strategy than the others, woodwind students at the intermediate level may have already developed their own practice strategies for playing the correct notes.

The Conducting Pedagogy of B. R. Henson: A Systematic Approach to Conductor Training

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December 2000
Committee Chairperson: Wendy L. Sims

Dissertation Abstract

The purpose of this study is to present an in-depth description of the systematic approach to conductor training developed and used by B. R. Henson. Henson's approach to conductor training incorporated score and historical study techniques, listening skills, choral and orchestral techniques, and the development of a baton technique firmly rooted in the art and tradition of conducting. This systematic approach also incorporated a conducting laboratory class for the structured presentation and development of the physical aspects of conducting technique.

Data collection for the study took place at The Conductors Institute on the campus of Southwestern University in Georgetown, TX. This institute, based on Henson's conducting pedagogy, was developed to improve conductors' baton technique, especially as it applies to choral/orchestral music. The researcher collected data from structured interviews, surveys, and videotaped master class and conducting lab sessions to help in the documentation and presentation of Henson's pedagogy.

While the review of the literature showed considerable research in the areas of choral conducting and conducting curriculum design, it revealed a lack of research specifically into the role of the baton in choral conductor training. Henson's systematic approach to conductor training, especially with regard to the development of baton technique in the conducting laboratory, warrants the attention of those in the fields of conductor training and choral music education.

Robert W. Gray's Development and Leadership of the Herculaneum, Missouri Band Program from 1965 to 1990

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Thesis Abstract

The purpose of this research project was to study the reasons for success of the Herculaneum, Missouri, high school and middle school band program from 1965-1990. During this time the band was under the direction of Robert W. Gray, PhD. An investigation of what influenced the success of the program under his leadership was conducted. The paper contains a review of related literature; an overview of Dr. Gray's education, professional training, and early teaching career; information regarding the band program during 1965-1990 and the reasons for success; survey results and discussion; a summary; and an appendix.

The following factors contributed to the success of his leadership. First was Dr. Gray's musical knowledge, illustrated in the survey section and appendix section. Second, his unique personality, which included a strong will tempered with a good sense of humor, made his interactions with his students and co-workers productive and enjoyable. The support that he received from the administration and the community also helped with the success of the program.

Do Percussion Students March to the Beat of a Different Drummer?

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Thesis Abstract

Problems with percussion sections in school band programs; including student behavior and discipline, boredom, and nonmusical performances, have been the focus of research for several decades. Areas of concern and proposed solutions identified by researchers during the 1950s - 1970s are compared with recent findings. Key concerns include the need for separate percussion instruction and reliable screening methods for potential percussionists.

This study involved surveying 42 band directors from schools in south and central Missouri regarding opinions and experience with percussion students on scheduling, staffing, and student behavior. Survey results were consistent with earlier research in identifying continued problems. Analysis of data indicates that in school districts where suggestions of early researchers were being implemented, band directors noted a higher level of success and satisfaction with their percussion education program.

The Effects of Vocal Improvisation on Attitudes, Aural Identification Skills, Knowledge of Music Theory, and Pitch Accuracy in Sight-Reading of High School Choral Singers

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Thesis Abstract

This study was conducted to test the effect of vocal improvisation on four areas of achievement: attitudes about personal skills and participation in choral rehearsals, aural identification and sight-reading skills, and music theory knowledge.

Control and experimental groups consisted of one auditioned, and one nonauditioned curricular choral ensemble of 9th to 12th grade students. Control group subjects ($N = 51$) received no instruction/practice in vocal improvisation. Experimental group subjects ($N = 41$) received 15 minutes of instruction/practice in vocal improvisation during each rehearsal period.

Significant pre/post gains ($p < .05$) for experimental group subjects were discovered in the following areas: (a) aural skills; (b) music theory knowledge; and (c) sight-reading skills. The experimental group scored significantly higher than the control group on the aural skills test (identification of chord roots and consonance versus dissonance). All other areas showed no significant difference between the groups.

The National Standards for Music Education: Awareness of, and Attitudes Toward, by Secondary Music Educators in Missouri

Cathi C. Wilson, MA
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Committee Chairperson: Wendy L. Sims

Thesis Abstract

The purpose of the study was to determine to what extent secondary music educators (instrumental and choral directors) in Missouri are aware of the voluntary National Standards for Music Education, and their attitudes toward them. Of equal importance, information was gathered regarding to what extent implementation is occurring in the classroom for each Standard, and the factors determining implementation decisions. Respondents were also questioned on their knowledge of Missouri's state standards for Fine Arts, the Show Me Standards. In addition, data were gathered to ascertain how music educators initially came to an awareness of the Standards, what opportunities for further training have been offered by their schools or districts, and whether they have taken advantage of that training.

Results indicated that nearly half of the respondents had made no changes in what they teach on a daily basis because of the National Standards. Another one-third responded that they had made a few changes. Only 7% of the respondents indicated that they always consider the National Standards when planning their daily lessons, and another 24% stated that they frequently consider them. Standards 1, 2, and 5 (singing; playing instruments; reading/notating) are the most addressed standards in these secondary music classrooms, with Standards 3 and 4 (improvising; composing/arranging) receiving the least attention. About three-quarters of the respondents have participated or are participating in some kind of further training in the National Standards, but over 80% of these responded that time was a major obstacle in preventing them from obtaining further instruction.

Nonmusic majors who Persist in Selected College Marching Bands: Demographic Characteristics and Myers-Briggs Personality Types

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August 2001
Committee Chairperson: Wendy L. Sims

Dissertation Abstract

The purpose of this study was to examine demographic characteristics and personality types of nonmusic majors who persist in college marching bands.

Students who participated in this study were in the marching band for one or more years and were nonmusic majors ($N = 114$). A Research Information Form (RIF) was used to collect demographic information such as; age, gender, major, year in college, years in marching band, instrument played, number in section, leadership position, scholarship, participation in band fraternity or sorority, participation in other campus organizations, reason for participating in marching band, and lived on or off campus. Each student also completed form G of the Myers-Briggs Type Indicator (MBTI). Information from the RIF was compared with the personality types generated by the MBTI.

The majority of the college nonmusic major marching band members who participated in this study displayed the following characteristics: (a) sophomore or junior; (b) male (58%); (c) aged 19-20; (d) played trumpet, trombone, alto saxophone, or clarinet; (e) were band student leaders; (f) had a band scholarship (if available), but would still march without one; (g) band was their major social organization; (h) had best friend(s) in band; (i) were in the band because it was "fun and exciting," (j) planned to march the following year; (k) GPA of at least 2.85. The overall personality type of the sample based on highest frequencies of cells was Extravert, Sensing, Thinking, Judging (ESTJ). However, the actual type with the highest frequency was the Introvert, Sensing, Thinking, Judging (ISTJ). This suggests that the nonmusic majors will be Sensing, Thinking, and Judging and could be either an Extravert or Introvert.

One of the challenges of the college band director is to recruit students for the marching band. In addition to the level of musicianship and the instrument the student plays, the director should be aware of the personality type of the student. Results from this study may provide the basis for the band director to predict the persistence of nonmusic majors in the marching band. Also, the director will be able to design systems for academic support, performance standards, and social activities based on personality type and demographic data found in this study. Hopefully, these systems will attract nonmusic majors and increase their persistence in the marching band.

NEWS BRIEFS

Call for Papers
American Orff-Schulwerk Association
NATIONAL CONFERENCE
Las Vegas, Nevada
November 6-10, 2002

The American Orff-Schulwerk Association will sponsor a research poster session at its national conference in Las Vegas, Nevada, November 6-10, 2002. Research reports dealing with any aspect of music learning through movement, speech, playing instruments, singing, improvisation, or composition in general music or music therapy settings are particularly appropriate.

A poster presentation format will be used. The author(s) of each paper accepted must be present at the conference poster session to discuss the research project with interested music educators. The author(s) must also furnish 25 copies of a report summary of 2 pages or less, as well as 10 copies of the completed report.

The following guidelines will be in effect for the paper selection process:

1. Submit five copies of a 3-page summary (maximum) excluding references, in 12-point type on 8 ½ x 11 paper, single-spaced, for use in judging the merits of the proposed submission. The summary should explicitly deal with as many of the following as are applicable, preferably in this order: (a) objectives or purposes; (b) perspectives or theoretical framework; (c) methods, techniques, or modes of inquiry; (d) data sources or evidence; (e) results (f) conclusions/point of view; and (g) educational or scientific importance of study.

2. Submissions should be sent to:

    Roy M. Legette
    School of Music
    250 River Road
    University of Georgia
    Athens, GA 30602-7287 USA

3. The author's name, institutional affiliation, and address (including e-mail) should appear only on a separate cover page.

4. Papers submitted for the conference must comply with the "Code of Ethics" published in each issue of the *Journal of Research in Music Education*.

5. Submissions must be postmarked by May 15, 2002.

6. A qualified panel of reviewers will read the abstracts submitted. Notification will be mailed by July 1, 2002. Summaries will not be returned.

Journal of Historical
Research in Music Education
Vol. XXII:1, October 2000

FEATURE ARTICLES

Research Studies in Music Education
Number 17, December 2001

FEATURE ARTICLES

Contact: Gary McPherson, Editor, University of New South Wales

INFORMATION TO CONTRIBUTORS

The editorial committee welcomes contributions of a philosophical, historical, or scientific nature, which report the results of research pertinent in any way to instruction in music.

Manuscripts should be addressed to William E. Fredrickson, Editor, Missouri Journal of Research in Music Education, University of Missouri-Kansas City, Conservatory of Music, 4949 Cherry Street, Kansas City, MO 64110-2229. Four copies of the manuscript must be submitted and must conform with the most recent style requirements set forth in the PUBLICATIONS MANUAL for the American Psychological Association (APA, 5th edition). For historical or philosophical papers, Chicago (Turabian) style is also acceptable. An abstract of 150-200 words should accompany the manuscript. All figures and tables should be submitted camera ready.

Manuscripts are reviewed by the editorial board in a blind review process. To assure anonymity during the review process, the author's name and affiliation should appear on a separate cover page only. Authors are also requested to remove all identifying personal data from submitted articles. The collective recommendations of the reviewers determine whether a manuscript will be accepted for publication. Manuscripts submitted for review must not have been published nor be under consideration for publication elsewhere.

The editorial committee subscribes to the **Research Publication/Presentation Code of Ethics** of the Music Education Research Council of the Music Educators National Conference and the National Research Committee of the American Music Therapy Association.