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Historic and Ethnic Music Found to Increase Geographic Understanding: A Quasi-Experimental Study

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Abstract: This article summarizes a quasi-experimental study, which demonstrated that integration of historic and ethnic music into the American history curriculum may lead to increased knowledge of the cultural and physical geography of the United States as well as enhanced student engagement. An experiment (n=215) conducted with eighth grade students investigated the effect that implementing supplementary music history workshops had on student attitudes and understanding of geographic concepts. Two instruments were used as pre-post tests: the Standards-Based Geography Test, Intermediate Level, from the National Council for Geographic Education and the Test of Geography-Related Attitudes. Analysis of covariance (ANCOVA) showed that students in the treatment group showed greater growth in geographic knowledge (effect size=.854) and more positive attitudes toward geography (effect size=.569).

Building and maintaining a nation state has long been a precarious undertaking in the United States... Disparate peoples, and their different customs that give shape to and have shaped the nation's past, present opportunities for conflict at almost every turn. (VanSledright, 2008)

The motto "*E Pluribus Unum*", which appears on the Great Seal of the United States, suggests the emergence of a single nation from individuals of diverse origin. Yet, the nature of the nation that emerged from this mixture of cultures remains the subject of continuing debate. Ideals like safeguarding the rights of individual citizens continue to exist in tension with other requirements, such as the need to build a national community whose citizens feel a sense of connection with one another and a respect for shared norms of responsible citizenship (VanSledright, 2008). How can schools help students comprehend this complexity?

This article proposes an inquiry-based approach that draws upon historic and ethnic music to build an appreciation for the complex cultural geography of the United States. Although music serves as the topic of student inquiry, no assertion is made that music constitutes a "universal language." Experimental research suggests that the same musical sounds can be apprehended or experienced quite differently. Yet, the movement of musical forms from culture to culture is less impeded than the flow of the products of language (Huron, 2004). The Mapping the Beat curriculum, originally funded by a National Geographic grant, takes advantage of the relative ease with which students respond to the music of other cultures and historical periods to add a cultural geography component to the United States history curriculum at the fifth (Scholl, 2006) and eighth (Richardson, 2010) grade levels.

This article reports on a quasi-experimental study that was carried out to test the effectiveness of the eighth-grade version of Mapping the Beat in: 1) enhancing the geographic understanding of middle school students; and 2) encouraging a continuing interest in geography. Through a series of workshops, students encounter the evocative sounds of Native American flutes and drums, the wide-ranging rhythms of the African Diaspora, the Latin tempos of the Southwest, the Cajun and Zydeco music of Louisiana, and the polkas of German, Czech and Polish immigrants. Students learn that the "down home" rhythms of country music were made possible by merging the bright sound of the banjo, created by slaves born in Africa, with the haunting sound of the fiddle, brought by the Mongols from Asia, and with the European guitar.

We begin with a discussion of multicultural music. Next, the conceptual framework for the study, based on the National Research Council report *How Students Learn* (2005), is described. The subsequent section addresses the need for a fresh approach toward teaching geography. That discussion is followed by a summary of the quasi-experimental study conducted with eighth grade students (n=215). Two instruments were used as pre-post tests: the Standards-Based Geography Test, Intermediate Level, from the National Council for Geographic Education, and the Test of Geography-Related Attitudes. Analysis of covariance (ANCOVA) showed that students in the treatment group demonstrated greater growth in geographic knowledge (effect size=.854) and more positive attitudes toward geography (effect size=.569).

Exploring the Roots of American Culture through Music

I hear America singing, the varied carols I hear;

Those of mechanics--each one singing his, as it should be, blithe and strong...
The delicious singing of the mother--or of the young wife at work--or of the girl
sewing or washing--Each singing what belongs to him or her, and to none else...
(Whitman, 1900)

Walt Whitman's poem "I Heard America Singing," gains its power from a metaphorical identification of the essential individuality of each person (and the group he or she represents) with a "song" that can be seen as a component within a great symphony. Before the advent of radio, in an era when individuals routinely sang to pass the time as they worked, this image had a direct connection to everyday life. Even today, when workers are more likely to be listening to recorded music, Whitman's poem reminds us of the close tie between music and identity. For students in middle school, where social groups often forge their identity, in part through their identification with specific genres of popular music, this tends to intuitively resonate.

Music has many functions in human life, nearly all of which are essentially social (Hargreaves & North, 1997). Music can arouse profound emotions. Individuals from widely differing backgrounds may share these experiences and establish contact through music. Still, much of the meaning with which people imbue music comes from the social and cultural context in which the music is created and heard. Broad interest in multicultural music education emerged in the mid-1960s, when preservation of ethnic heritages became a national focus (Mark, 1998).

In 1967, the Music Educators National Conference (MENC) suggested that music of all periods, styles, forms, and cultures belongs in the curriculum. Such diversity allows students to develop understanding of "different but equally valid forms of musical and artistic expression" (Anderson & Campbell, 1989, p. 1). Campbell (1996) noted that multicultural education offers students "an understanding of the unique cultural and ethnic perspectives that are integral to the American cultural composite" (p. 7). Since culture shapes musical behavior--and music, in turn, influences cultural values (Radocy & Boyle, 1997)--students who are introduced to multicultural music not only learn about diverse musical genres; they also learn about language and culture.

Recently, there has been a resurgence of interest in the role music might play within the broader school curriculum. Attention has been focused on the positive effect music can have on cognition and student learning. Catterall (2009) points out that music (like mathematics) requires the ability to recognize patterns and relationships. The emotional involvement characteristic of musical experience also helps to focus attention, enhancing memory.

New Insights into How Students Learn

A classroom of students need only look at each other to see remarkable variation in height, hair color and texture, skin tone, and eye color, as well as in behaviors. Some differences, such as gender, are discrete: students are male or female. Others, such as hair color or height, vary continuously within a certain range. (Stewart, Cartier & Passmore, 2005)

How might we foster students' abilities to use such everyday observations to understand human similarities and differences? One answer may be derived from the field of genetics, where a science lesson might focus on a discussion of how X and Y chromosomes divide the human race into males and females; other human traits are tied to complex interactions among multiple

genes. Alternatively, the variation in height, hair color and texture, skin tone, and eye color that often exist in a single American classroom could be tied to the impact that immigration from around the world has had in fostering the diversity of the United States.

If we are to build a national community whose citizens feel a sense of connection with one another and a respect for shared norms of responsible citizenship, we cannot ignore the naïve preconceptions that students sometimes carry with them into the classroom. If their existing preconceptions are not engaged, students may fail to grasp new concepts and information, or they may learn the new concepts and information only for a test, then revert to their original preconceptions outside the classroom (Donovan & Bransford, 2005). By enabling students to meaningfully engage with the authentic cultural narratives of groups whose experiences they might easily misunderstand, ethnic and historic music encourages students to reconsider naïve assumptions and forge a more accurate understanding of a newly encountered culture.

Teachers have long used historical texts as tools to help students better understand the perspective of people living in past eras. However, the ideas that students bring with them into the classroom, based on their own experience of how people are likely to behave (National Research Council, 1999), can cause misconceptions when applied to another era. For example, the concept of “liberty” is not the same now as it was in the 17th century (National Research Council, 2005). Nor are farmers and soldiers the same in South America and Australia.

Without activities that help students to “put themselves in another’s shoes,” the natural inclination is to assume more similarity than difference across eras and cultures. Yet, the rules by which communities work and people interact can shift markedly according to time and place (Ashby, Lee, & Shemilt, 2005). Integrating historic songs into the curriculum puts students in touch with the perceptions of another era. This allows students to develop empathy. Of course, empathy has a somewhat different meaning within history education than it does in everyday life. In a history class, developing empathy involves showing that what people did in the past makes sense in terms of their ideas about the world.

The central idea here is that people in the past did not all share our way of looking at the world. For this reason, when writing or reading history we must understand the ideas, beliefs, and values with which different groups of people in the past made sense of the opportunities and constraints that formed the context within which they lived and made decisions about what to do. (Lee, 2005, p. 46)

The emotional content of historic songs draws the interest of the whole class, not just those students who are most adept at grappling with abstract concepts. However, the emotional connection stimulated by songs of yearning, struggle and loss also poses a problem, since it can get in the way of the detachment needed to look at the songs as historical evidence. For the goal of the Mapping the Beat lessons is not just to understand how a group of people felt but to help students use that understanding to make sense of what those people did. That requires hard thinking and the use of evidence. Students are encouraged to use the songs as evidence that, in combination with available facts, can be used to construct a picture of the past through inference. Slowly, students come to realize that they do not have to simply accept or reject particular historical accounts; they can work out their own picture of events based on available evidence.

Integral to this process is coming to understand two parallel distinctions, between relic and record and between intentional and unintentional evidence. A record is a source that intends

to tell the reader about an event or state of affairs. Relics are sources that were not intended to provide this kind of record, or which can be used by an investigator to answer a specific question in ways that do not depend on what they were intended to report. Tools, coins, and songs are traces of past human activity that can be used to draw inferences about the past. However, the goal of the Mapping the Beat lessons is not just to stimulate interest in history. The primary goal is to help young citizens feel a sense of connection with peers of diverse origins, as well as a respect for shared norms of responsible citizenship. This requires bringing the discussion into the present. To do this, Mapping the Beat draws on the discipline of cultural geography.

Toward a Renaissance in Geographic Understanding

Just as I am shaped by my location, my location is shaped by my presence.
(Davis, Sumara & Kiernen, 1996, p. 157)

Geography can be seen as the study of the on-going interaction between human cultures and their physical environments. This inclusion of both social and scientific components situates geography in a unique position, bridging the social and natural sciences. The “stepchild” status of geography in the United States has its roots in the era when the modern public school curriculum began to take shape at the end of the 19th century. At that time, academic geographers were generally more concerned with study of the physical world than with the human world. Therefore, early curriculum planners grouped geography with the natural sciences rather than with the humanities and social sciences.

In the early 20th century, geographers began to focus more on human and cultural issues. By then, however, history had come to dominate social studies; geographic knowledge was perceived as merely the identification of states, capitals, rivers, and oceans. As early as 1916, Dewey urged educators to adopt a more enlightened approach, asserting: “This setting of nature does not bear to social activities the relation that the scenery of a theatrical performance bears to a dramatic representation; it enters into the very make-up of the social happenings that form history” (1966, p. 211). But history teachers continued to focus on decontextualized events.

As a result, questions concerning how human beings shape their environment—and are, in turn, shaped by the landscapes and cityscapes they create—were seldom explored. Recently, there has been the beginning of a renaissance in geographic education (Bettis, 1995; Boehm, 1997). Publication of *Guidelines for Geographic Education* (1984) provided the first clear content and skills framework for K-12 geography (Peterson, Natoli, & Boehm, 1994). In 1989, geography was included as one of the five “core subjects” in the National Education Goals. President Clinton later signed these goals into law in the *Goals 2000: Educate America Act*.

National geography standards were developed as part of the Goals 2000 initiative, although the effect on what happens in social studies classrooms remains unclear (Bednarz, Downs, & Vender, 2003). Congress also authorized a geography assessment, to be conducted in 4th, 8th, and 12th grade as part of the National Assessment of Educational Progress (NAEP). Results from the 2001 NAEP assessment in geography showed an increase in scores since 1994. However, on average, only 2% of students tested performed at the Advanced level; 23% performed at the Proficient level, 48% at the Basic level, and 27% at the Below Basic level. This lack of geographic proficiency has been affirmed by other research. Lash (2004) pointed out that 11% of young Americans could not locate the U.S. on a map; 58% were unable to locate Japan.

The same year that *Geography for Life: National Geography Standards* was published, Downs (1994) cautioned that there was no significant, empirically sound, theoretically grounded body of research that could be used to build a practical, relevant knowledge base for geography education. In 2002, Lash and Wridt complained that much of the research on geography education focused on “a *micro* setting or scale of analysis, such as the formal learning environment of the classroom” (p. 159). Bednarz, Downs, and Vender (2003) noted that the existing body of research literature on geography education “can be characterized as small-scale (in terms of numbers of participants), largely asynchronous (few longitudinal studies), rarely controlled (no formal experimental design), and often descriptive and anecdotal” (p. 29)

To address these identified gaps in the research literature, the study summarized in this article used an experimental design with random assignment to treatment and control groups. Middle school classes in United States history were chosen, because the most consistent representation of geography is found at the middle school level (Anthamatten, 2004). Instead of targeting a single classroom, the sample included all eighth grade United States history classes at a suburban middle school. Both treatment and control groups were taught by the same teachers. Following Kirman’s (2003) suggestion, an inquiry approach was used in designing the treatment lessons, with the intent of better motivating and engaging students.

Research Methods

The workshops used in this study were adapted from the Mapping the Beat curriculum, which was developed with funding from the National Geographic Education Foundation. The original Mapping the Beat program was developed by the ArtsBridge program at the University of California, San Diego (Scholl, 2006). Begun at the University of California, Irvine, in 1996, ArtsBridge America is a network of arts outreach programs that now includes 25 universities in 14 states. Each university program sends advanced arts students into K-12 schools to provide instruction to children who would not otherwise have access to high quality arts lessons.

At the heart of the Mapping the Beat program are three concepts--environment, identity, and movement--that were modeled on the standards outlined in *Geography for Life: National Geography Standards* (1994). These themes were selected for their significance to the study of both music and geography. Each unit begins with an introductory conversation about how specific concepts apply to students’ lives, followed by a presentation of several musical examples that provide a clearer understanding of musical forms from around the world. Music is discussed as a record of cultural migration, a product of the geographic environment (what materials were available for instruments?), and a cornerstone of personal and group identity.

The Mapping the Beat lessons were refined and revised in response to feedback from teachers and teaching artists who had implemented the lessons through school-university partnerships at eight ArtsBridge America campuses.¹ Initially, the lessons were designed to enhance the American history curriculum at the fifth grade level and included live music. But classroom teachers found that, when funding for musicians was not available, they could deliver much the same lessons using recorded music. So, in the interest of making the findings as generalizable as possible, the eighth grade lessons in this study were taught with recorded music.

Description of the Research Site

Built in 1953, California Middle School (CMS) serves 760 students in grades 6 to 8. The CMS attendance area includes lower- and middle-income families; in most families, both parents work. The student population is diverse: 30% white, 29% Asian, 23% Hispanic, 7% Filipino and 4% African American. English language learners (ELLs) account for 15.5% of the school's total population. An additional 8% of the students are English learners who have previously been re-designated as Fluent English Proficient.

CMS is located in a high-achieving school district with an average daily attendance of approximately 25,000. In 2008, the school's Academic Performance Index (API) was 853 out of 1000 possible points, ranking it among the top tier of middle schools in the state. CMS was named a California Distinguished School in 1996, 2003, and 2009. For this study, the school's record of high achievement provided an important advantage: the social studies curriculum was already considered better than average. So the curriculum delivered to the control group would provide a strong representation of the existing level of geography instruction in California.

Treatment and Control Groups

Most of the eighth grade students at CMS (85%) were randomly assigned by computer to one of seven different social studies classes; three classes became the "control" group and four classes were designated as the "treatment" group. However, random assignment was not possible for the other 15%, for the following reasons. Those eighth grade students with Individualized Educational Programs (IEPs) were enrolled in small "Learning Center" classes that were only available during certain periods of the day. On the other end of the academic continuum, a handful of high-achieving students were enrolled in classes at the high school for the first two or three periods of the day. Most of these academically advanced students were placed in social studies classes during either Period 5 or Period 6, after lunch, when all four of the treatment classes were scheduled. Several classes at CMS, including English Language Development and Advanced Band, were offered just one period each day. Such constraints influenced the master schedule, so that 15% of students could only take their history class during specific time slots.

Demographic and academic proficiency data was gathered for students in both the treatment and control groups. The discrete characteristics used in analysis included: gender, ethnicity, level of English language proficiency, gifted and talented program participation, and qualification for free or reduced lunch. To examine differences in group characteristics and evaluate variables that might be confounding factors in the analysis of program effect, initial data analyses were conducted using Chi-square and Fisher exact tests. No significant difference was found between control and treatment groups.

Description of Mapping the Beat Intervention

Two 45-minute class periods were dedicated to each workshop, for a total of 18 class periods. Control and treatment groups explored similar United States history topics each week. The control group included three social studies classes and emphasized readings in the text and of primary source documents, along with comprehension questions and whole class discussions. The treatment group included students in four classes whose curriculum was based primarily on Mapping the Beat lessons that had been modified by the teachers for use at the eighth grade

level. Students studied geographic representations, including maps, supplemented by text material and music. Treatment lessons (see below) emphasized the migration of musical forms to the United States, as well as the impact of music, geography, and cultural influences on the nation's history.

Workshop 1: Instrument Migration.

Using a large world map, students identified areas of origin of musical instruments that included the fiddle, guitar, accordion, banjo, and piano. Students identified North American areas of settlement for various immigrant groups.

Workshop 2: American Work Songs.

Students explored economic geography and how music was used to organize different kinds of work. They studied sea shanties sung on whaling boats, work-tempo songs associated with industrialization, spirituals attributed to slaves who toiled in the cotton fields of the South, and the rugged songs of railroad workers.

Workshop 3: The Ngoni, the Banjo, and the Atlantic Slave Trade.

This workshop focused on West African tribal music, the hardships and dislocation produced by the slave trade, and the influence of West African music on African-American musical traditions.

Workshop 4: Music and Migration in Texas.

Students traced many cultural groups who settled in Texas as the territory changed hands among Spain, Mexico, and the United States.

Workshop 5: Unconventional Maps and the Underground Railroad.

This workshop focused on African-American spirituals, including the songs and coded maps (in the form of quilts) that were used to help guide runaway slaves on the journey to freedom in the north.

Workshop 6: Civil War Bands and Their Music.

Students explored the musical culture of the United States prior to and during the Civil War, viewing the North/South conflict through patriotic songs and investigating the role that music played in Civil War propaganda.

Workshop 7: Flutes, Natural Resources and Trade in the Great Plains.

This unit examined the cultural and material influences on the Native Americans who lived in the Great Plains.

Workshop 8: Chinese in America.

Students studied the contribution of Chinese immigrants made to the settlement of California and the construction of the transcontinental railroad.

Workshop 9: The Piano and the Industrial Revolution.

Through learning about the Steinway family and the revolution they created in piano production, students examine the introduction of mass production and development of immigrant labor sources in cities.

Quantitative Measures

Five factors were considered in the choice of assessment tools for measuring geographic understanding and geography-related attitudes. Each assessment (a) was produced by geography and education experts; (b) was considered valid; (c) could be administered to a heterogeneous class during a single class period; (d) was appropriate as a measurement for eighth grade students; and (e) would provide quantitative data for statistical analyses. The two assessments chosen were the Standards-Based Geography Test, Intermediate Level, Parts I and II (2000) from the National Council for Geographic Education (NCGE) and the Test of Geography-Related Attitudes.

The original NCGE Standards-Based Geography Test included 90 questions. After discussions with Dr. Norman Bettis (a principal author of the exam) and with the permission of the Director of the National Council for Geographic Education, 52 of the original 90 NCGE questions were selected. The 52 questions chosen measured three of the six Essential Elements: Places and Regions, Human Systems, and Environment and Society. These three Essential Elements were the ones most strongly aligned with the nine workshops used in this study. Also, the shortened exam could be completed by students during one 45-minute class period.

Evidence concerning the strengthening or weakening of student motivation is always relevant to a verdict based on achievement measures (Schrag, 2009). Therefore, including an attitude survey was deemed important as a measure of student attitude and motivation. So, the 29-question Test of Geography-Related Attitudes (ToGRA) (Walker, 2006), was used to measure student attitudes on discrete scales that included leisure interest in geography, enjoyment of geographic education, and career interest in geography.

Quantitative Findings

Student assessment results from the two baseline/follow-up measures (the NCGE and the ToGRA) provided quantitative data for statistical analysis, which was used to address the following research questions:

1. Did the learning experienced by the treatment group lead to greater geographic understanding than the control group, as measured by the National Council for Geographic Education (NCGE) Intermediate Standards-Based Geography Test?
2. Did the learning experienced by the treatment group lead to greater improvement in geography-related attitudes than the control group, as measured by the Test of Geography-Related Attitudes (ToGRA)?
3. When controlling for particular groups (English learners, male/female, low-achieving, GATE, Asian, Hispanic, Anglo, students on Free or Reduced Lunch), did the treatment group experience greater improvement than controls in geographic literacy and geography-related attitudes, as measured by the NCGE and the ToGRA?

Results for NCGE Intermediate Standards-Based Geography Test

In this section, results from baseline and follow-up administration of the NCGE test are discussed. Standard t-tests were applied, with appropriate consideration for within group variance assumptions as well as distributional assumptions. Where outcome measures were

questionable, a Wilcoxon non-parametric model was applied for confirmation of the results. In Table 1 baseline and follow-up test results are shown for all 215 students, including the control and treatment groups. On the NCGE, the mean baseline score was 27.7, with a standard deviation of 6.81 and a range of 9 to 43; the mean follow-up score was 31.9, with a standard deviation of 7.3 and a range of 9 to 47.

Table 1: *Baseline and Follow-up Test Scores on the NCGE Sub-scale*

| Test Scores | n=215 | Mean (SD) | Range |
|----------------------|-------|--------------|----------|
| NCGE Baseline | | 27.7 (6.81) | [9 - 43] |
| NCGE Follow up score | | 31.9 (7.3) | [9 - 47] |

Table 2 shows comparison data for control and treatment groups. On the baseline test for the control group, the mean score was 27.8, with a standard deviation of 7.7 and a range of 9 to 43; for the treatment group, the mean was 27.6 with a standard deviation of 6.2 and a range of 10 to 39. On the follow-up test, the mean score for the control group was 28.1 with a standard deviation of 7.1 and a range of 9 to 39. By contrast, the mean score on the follow-up test for the treatment group was 34.4 with a standard deviation of 6.4 and a range of 15 to 47. As shown in Table 2 in the column Treatment – Control Difference of Means, the mean score for the control group was slightly higher (0.25) on the baseline measure than the mean for the treatment group. On the NCGE Post-Test for the treatment group, the mean score increased by 6.26 points more than the mean score for the control group, a statistically significant outcome ($p < 0.0001$).

Table 2: *NCGE Student Scores: Baseline and Follow-up by Group*

| Test Score | Control n = 84 | | Treatment n = 131 | | Treatment- Control Diff. of Means | 95% CI Diff of Means | prob > t |
|------------------|-------------------|----------|----------------------|-----------|---|-------------------------|-----------|
| | Mean (SD) | Range | Mean (SD) | Range | | | |
| NCGE Baseline | 27.8 (7.7) | [9 - 43] | 27.6 (6.2) | [10 - 39] | -0.25 | (-2.22 , 1.72) | 0.803 |
| NCGE Post | 28.1 (7.1) | [9 - 39] | 34.4 (6.4) | [15 - 47] | 6.26 | (4.38 , 8.19) | <0.0001 |

Table 3 presents results of a t-test in which the mean change in the control group scores, 0.27, is subtracted from the mean change in the treatment group scores, 6.79, resulting in a Difference of Means score of 6.51. The difference is statistically significant ($p < 0.0001$).

Table 3: *Change Score Analysis NCGE*

| Test Score Change (Post-Pre) | Control n = 84 | | Treatment n = 131 | | Trt -Control Diff of Mean Change | 95% CI Diff of Mean Change | prob > t |
|------------------------------|---------------------|------------|------------------------|-----------|--|----------------------------------|-----------|
| | Mean Change (SD) | Range | Mean Change (SD) | Range | | | |
| NCGE | 0.27 (3.68) | [-11 , 11] | 6.79 (3.68) | [-8 , 25] | 6.51 | (5.4 , 7.6) | <0.0001 |

Table 4 compares control and treatment group scores in another way, looking at the number of students in the control and treatment groups who improved by one or more points, remained the same, or dropped by one or more points as shown by baseline and follow-up NCGE scores. As shown in Figure 2, 19 out of 84 students in the control group, or 23%, had a negative change. By contrast, only 4 out of 131, or 3% of the treatment students had a negative change. Looking at students who improved, when compared to baseline scores, only 27 out of 84, or 32% of control group students improved by one or more points on the NCGE, as compared to 124 out of 131, or 95% of the treatment group students who improved by one or more point.

Table 4: *Contingency Table by NCGE Change Categorical Variables*

| | Negative Change | No Change | Positive Change | |
|------------------|--------------------|--------------|--------------------|-------|
| Control | | | | |
| Count | 19 | 38 | 27 | 84 |
| Total % | 8.84 | 17.67 | 12.56 | 39.07 |
| Col % | 82.61 | 92.68 | 17.88 | |
| Row % | 22.62 | 45.24 | 32.14 | |
| Treatment | | | | |
| Count | 4 | 3 | 124 | 131 |
| Total % | 1.86 | 1.40 | 57.67 | 60.93 |
| Col % | 17.39 | 7.32 | 82.12 | |
| Row % | 3.05 | 2.29 | 94.66 | |
| | 23 | 41 | 151 | 215 |
| | 10.70 | 19.07 | 70.23 | |

Regression Analysis

For the final analyses, Analysis of Covariance (ANCOVA) was applied to examine program effect differences between the treatment and control groups while controlling for any pre-score effect. Table 5 provides results of regression analysis to determine whether the control or treatment was more successful, as measured by NCGA, when controlling for other variables.

Table 5: Regression Results: Post Score => Pre Score + Group + Covariates

| | Term | Estimate | Std Error | t Ratio | Prob> t |
|--------------|--------------|----------|-----------|---------|-------------------|
| NCGEPost Sum | Intercept | 6.327 | 1.312 | 4.821 | <0.0001 |
| | NCGE Pre Sum | 0.670 | 0.045 | 14.728 | <0.0001 |
| | GROUP | 6.270 | 0.559 | 11.210 | <0.0001 |
| | HISPANIC | -0.757 | 0.796 | -0.950 | 0.3432 |
| | ASIAN | 0.123 | 0.602 | 0.204 | 0.8382 |
| | GATE | 2.577 | 0.842 | 3.062 | 0.0025 |
| | FREE | | | | |
| | LUNCH | 0.494 | 0.870 | 0.568 | 0.5706 |

The data shown in the row labeled “GROUP” are of particular interest. As shown in the column titled “Estimate,” when controlling for all other categories included in the column labeled “Term,” on the 52-question NCGE the mean score for students in the treatment group was 6.27 points higher than the score for students in the control group. This is statistically significant at $P=<0.0001$, as indicated in the column labeled Prob>|t|.

Results for Baseline and Follow-up Administration of ToGRA

In this section, results from the baseline and follow-up Test of Geography-Related Attitudes (ToGRA) attitude surveys are presented and discussed. The ToGRA subscales related to student attitudes toward (a) geography-related careers, (b) geography-related enjoyment, and (c) interest in geography-related activities. Table 6 indicates the difference between the treatment and control groups on the baseline test was statistically significant.

Table 6: ToGRA Student Scores – Baseline and Follow-up by Group

| Test Score | Control n = 84 | | Treatment n = 131 | | Trt -Control Diff of Means | 95% CI Diff of Means | prob > t |
|----------------|-------------------|------------|----------------------|------------|----------------------------------|----------------------------|-----------|
| | Mean (SD) | Range | Mean (SD) | Range | | | |
| ToGRA Baseline | 2.3 (0.6) | [1 - 3.28] | 2.0 (0.7) | [1 – 3.76] | -0.29 | (-0.47, -0.12) | 0.001 |
| ToGRA Post | 2.2 (0.6) | [1 - 3.31] | 2.6 (0.7) | [1 – 4.38] | 0.26 | (0.08 , 0.44) | 0.006 |

For the control group, the mean score was 2.3 with a standard deviation of 0.6 and a range of 1 to 3.28; for the treatment group, the mean was 2.2 with a standard deviation of 0.6 and a range of 1 to 3.31. For the control group, the mean baseline score on the ToGRA was higher than the mean score for the treatment group. On the follow-up test in December of 2008, the difference between the two groups was statistically significant, but the mean for the treatment group was now higher, showing an improvement of 0.26. For the ToGRA total score and for the subscales, the mean of the treatment group was lower than the mean of the control group on the baseline exam, while, for the follow-up scores, the treatment group mean was higher than the mean of the control group, suggesting that geography-related attitudes of treatment group

students generally became more positive between September and December of 2008, while geography-related attitudes of the control group students became more negative.

Table 7 displays attitudes toward geography-related careers, enjoyment, and leisure activities. In all cases (including both the “total” ToGRA mean scores as well as the subscales), the control group went down whereas the treatment group scores went up. Comparisons of the change scores indicate statistically significant mean differences. The greatest mean change for both treatment and control groups was the “enjoyment” category.

Table 7: *ToGRA Subscales, Baseline, and Follow-up Mean Scores by Group*

| Test Score | Control n = 84 | | Treatment n = 131 | | Trt -Control Diff of Means | 95% CI Diff of Means | prob > t |
|-----------------------|-------------------|------------|----------------------|-----------|-------------------------------------|-------------------------|-----------|
| | Mean (SD) | Range | Mean (SD) | Range | | | |
| Career Baseline | 1.96 (0.66) | [1 - 3.3] | 1.64 (0.58) | [1 - 3.2] | -0.33 | (-0.15, -0.50) | 0.0003 |
| Career Post | 1.88(0.59) | [1 - 3.2] | 2.04 (0.67) | [1 -4.2] | 0.16 | (-0.02 , 0.33) | 0.083 |
| Enjoyment Baseline | 2.55 (0.69) | [1 - 4] | 2.24 (0.82) | [1 - 4.6] | -0.31 | (-.10, -0.52) | 0.003 |
| Enjoyment Post | 2.4 (0.78) | [1 - 3.8] | 2.75 (0.86) | [1 - 4.8] | 0.35 | (0.12 , 0.58) | 0.003 |
| Leisure Baseline | 2.39 (0.63) | [1 - 3.75] | 2.16 (0.79) | [1 - 4.1] | -0.23 | (-0.03 , -0.43) | 0.02 |
| Leisure Post | 2.31 (0.72) | [1 - 3.9] | 2.57 (0.750) | [1 -4.75] | 0.26 | (0.05 , 0.46) | 0.013 |

Table 8 presents statistical test score change, subtracting the baseline score from the post score. The mean change in control group scores, -0.11 (with a standard deviation of 0.52) is subtracted from the mean change in treatment group scores, 0.45 (with a standard deviation of 0.60) resulting in a Difference of Means score of 0.4 (with a standard deviation of 0.7.) At a 95% Confidence Interval, the difference of means was statistically significant, $p < 0.0001$.

Table 8: *Change Score Analysis for the ToGRA*

| Test Score Change (Post-Pre) | Control n = 84 | | Treatment n = 131 | | Trt -Control Diff of Means | 95% CI Diff of Means | prob > t |
|---------------------------------|-------------------|------------|----------------------|-------------|----------------------------------|----------------------------|-------------------|
| | Mean (SD) | Range | Mean (SD) | Range | | | |
| ToGRA | -0.11 (0.52) | [-1.5 , 1] | 0.45 (0.60) | [-0.9, 1.9] | 0.55 | (0.4 , 0.7) | <0.0001 |

Table 9 shows regression results for the 29-question attitude survey. This table provides results for regression analysis from responses to the questions. When controlling for all identified categories (gender, ethnic group, etc.), the treatment group showed a mean gain of 0.379. As shown in the last column, this is statistically significant at $P = < 0.0001$.

Table 9: Regression Results: Post Score => Pre Score + Group + Covariates ToGRA Scores

| | Term | Estimate | Std Error | t Ratio | Prob> t |
|---------------------------|----------------|----------|-----------|---------|-------------------|
| ToGRA Total (Mean) | Intercept | 0.900 | 0.161 | 5.594 | <0.0001 |
| | Togra Pre Mean | 0.594 | 0.055 | 10.797 | <0.0001 |
| | Group | 0.379 | 0.076 | 4.988 | <0.0001 |
| | HISPANIC | 0.024 | 0.105 | 0.231 | 0.8176 |
| | ASIAN | 0.097 | 0.080 | 1.214 | 0.2263 |
| | GATE | 0.366 | 0.110 | 3.329 | 0.0010 |
| | FREE LUNCH | -0.036 | 0.116 | -0.315 | 0.7533 |

Effect Size for NCGE Test and ToGRA

As shown below, for the NCGE the effect size (0.854) was large. However, for the overall ToGRA results, the effect size (0.569) was medium.

| Analysis Column | Std Dev | Reg Coeff | Effect Size |
|-----------------|---------|-----------|-------------|
| NCGEPost Sum | 7.344 | 6.270 | 0.854 |
| ToGra Post Mean | 0.667 | 0.379 | 0.569 |

The large effect for the NCGE scores is consistent with other research findings in this study. The medium effect size on geography-related attitudes indicates that students were beginning to feel more positively about geography. Still, even after taking part in high-interest workshops, relatively few students responded with enthusiasm to the prompts: “As a gift, I would like to be given a book about people and places,” and “I would like to be a geographer when I leave school.” Their positive feelings toward geography had apparently not yet reached the level where they would seek out such experiences in their leisure time.

Implications for Social Studies Education

Helpfenbein and Segall (2008), Bednarz (2003), and Downs (1994) have written about the need for more research on students' geographic understanding. Our study focused on integration of history and music into U.S. history classes. Control group students studied historical source documents and were given geography lessons using maps (but no music) in lieu of attending the Mapping the Beat workshops. There were similarities between the two experiences. Both listening to historic songs and reading historic source documents allowed students to gain access to an era through the words of people who lived at the time studied. In terms of enhancing students' learning, however, the two experiences had quite different results.

Music includes an element of direct, sensory experience that the reading of historic documents lacks. When students listened to or sang a song, whether “Yankee Doodle” from the American Revolution or “Sweet Betsey from Pike” from the era of the California Gold Rush, the sensory experience appeared to reinforce the conceptual understanding derived from the lecture and text, embedding the information more deeply in memory. Given the emphasis schools currently put on the cognitive processing of data, it is easy to forget that the body is also a site

for learning—separate from the intellect—that can provide students with a parallel source of information and understanding (Greenland, 2000). Bringing music into the classroom strengthened overall learning by tapping into this parallel information source.

By tracing the spread of musical forms (the rhythms of the African Diaspora, Celtic tunes brought to the Appalachians by Scotts-Irish immigrants, the Latin beat driving the fingers of German accordion players in Texas), middle school students in the treatment group were able to explore the diverse ways in which American culture is linked to a wider world. Students eagerly followed the history of how African-American music evolved from sorrow songs sung in the fields, into the genres we know as jazz, gospel, rock and rap. The journey was made memorable by links students discovered between the music of past eras and contemporary popular culture.

Discussion: Investigating the Power of Song

The growth in the geographic knowledge of the treatment group (effect size=.854) came as a surprise to the researchers, especially given the high quality of the curriculum offered to the control group. Teachers commented on the enthusiasm gap between students in the music workshops and students in the group that read and discussed original historic documents. There was speculation that, since popular music played an important role in student social life, perhaps students may have been primed to see the popular music of another era as inherently interesting and therefore more memorable. However, university colleagues mentioned another possibility.

Research has shown that a handful of facial expressions appear to be universal, although these expressions are susceptible to modification through culture-bound "display rules" (Ekman, & Friesen, 1998). Could there be analogous broad similarities in how human beings experience sound? This has been the subject of much debate, with musical psychologists tending to assume that such similarities exist, while ethnomusicologists assume that there are broad differences in how people experience sound, shaped by variations of their cultural milieu. However, research into the evolutionary roots of language hints at biological commonalities.

Human mothers in all cultures sing to infants, just as babies around the world respond with pleasure to lullabies (Griffiths, 1997). Given that responsiveness to music develops in all normal humans at an early stage in development, without special training, there is good reason to suspect that music has a biological, as well as a cultural, foundation. Certainly, song, which requires only the body's own resources, reaches far back into evolutionary time. Many non-human species sing: not just birds, but also dolphins and whales, even primates—especially gibbons (Boyd, 2009). Could song be a more ancient human capacity than language?

There are currently two key theoretical explanations of how human language evolved (Mithen, 2005). One approach, especially associated with the work of Derek Bickerton and Ray Jackendoff, argues that words came before grammar. An alternative approach, developed by Alison Wray (2002) and Michael Arbib (2005), suggests that pre-modern communication was constituted by "holistic" phrases, each of which had a unique meaning but which could not be broken down into meaningful constituent parts. This approach assumes that discrete words, which can be combined to make new and unique utterances, were a relatively late development in the evolutionary process that led to language. Instead, the holistic phrases used in pre-modern communication would have made extensive use of variation in pitch, rhythm and melody to communicate information, express emotion and induce emotion in other individuals.

Implicit in this theory is the assumption that language and music have a common origin.

In *The Singing Neanderthals*, Mithen (2005) argues that the vocalizations, gestures and body postures used by non-human primates today are most likely analogous to those used by early hominids during the Pliocene. These vocalizations can accurately be described as “holistic” in that they do not appear to be composed out of discrete “words,” with their own individual meanings. Could such vocalizations have given rise to the phenomenon we call music?

Of course, there is a considerable chasm between the spontaneous vocalizations of non-human primates and a modern opera. However, if music is a version (albeit formalized) of the spontaneous, emotionally infused musical expressions of our pre-modern ancestors, then this could help explain the oft observed power of music to cut through boredom and routine, communicating with primal directness, even in the face of cultural difference. Further research is needed to establish whether music should be considered an adaptive function or merely a side effect of traits that evolved for other functions. Still, the mere presence of music in every known culture implies a genetic basis (McDermott, 2008). This, in turn, suggests that music may possess unique power as a pedagogical tool for enhancing cross-cultural understanding.

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