Metropolitan Nashville Public Schools

prelude

Music Makes Us Baseline Research Report

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Music Makes Us Baseline Research Report

Becky J. A. Eason, Ph.D.
Center for Public Partnerships & Research
The University of Kansas

Christopher M. Johnson, Ph.D.
Music Research Institute
The University of Kansas

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Contact:
Laurie T. Schell, Director, Music Makes Us, Metro Nashville Public Schools
laurie.schell@mnps.org

Report editing and design by:
Dana Powell Russell, Ed.D., Organizational Effectiveness & Learning Consultant
info@danapowell.org

Cover design by:
Mary Elizabeth Hall, Multi Media Design Specialist, Metro Nashville Public Schools

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foreword

Nationally, the value of music and arts education has gained acceptance and great popularity among parents, the public, and policymakers. Paradoxically, arts education remains on the sidelines when it comes to budgeting and education reform agendas. This is not a new conversation, but a complex and nuanced one that has developed since the 1970s, with local or federal victories and setbacks along the way.

One lesson learned is that we have the best chance of success by working at the local level. In Nashville, or "Music City", we have a great opportunity to unite public and private resources to transform the learning experience of our 82,000 students in Metro Nashville Public Schools.

A joint effort of Metro Nashville Public Schools, Mayor Karl Dean, and music industry and community leaders, the Music Makes Us initiative aspires to be a national model for high-quality music education. With a focus on music literacy and student participation, Music Makes Us is strengthening traditional school music—chorus, band, and orchestra—while adding a contemporary curriculum that embraces new technologies and reflects a diverse musical landscape.

> *Launched in Fall 2012, the vision of Music Makes Us is for all Kindergarten through Grade 12 students in Metro Nashville Public Schools to have equitable access to opportunities for participation in high-quality traditional and contemporary music instruction that is standards-based and sequential, taught by highly qualified music educators, and enhanced by a network of music professionals, music industry and community based organizations from the Nashville community and beyond.*

The theory of change is a simple one: To have a world-class music education program we must 1) engage more students in music; 2) reflect our culturally- and ethnically-diverse community where over 120 different languages are spoken; 3) restore and strengthen the legacy programs in chorus, band and orchestra; and 4) excite students around new and emerging music technologies.

The purpose of this paper is to establish a benchmark—a picture of students who have been enrolled in middle and high school music and the potential impact of music study on student engagement and academic achievement. Subsequent research and evaluation studies will help us to learn more about music and student learning and achievement and ascertain strengths of the Music Makes Us initiative and areas needing adjustment.

We are excited about the initiative and the initial findings. And we are optimistic in the commitment and strength of all partners—the city, school district and music community—to work in tandem to bring it to life.

Laurie T. Schell
Director, Music Makes Us
Metro Nashville Public Schools
October 2013

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executive summary

About the Study

In the fall of 2011, in a public-private partnership with Mayor Karl Dean's office, music industry leaders such as The Recording Academy, and philanthropists including Martha Ingram, the Metropolitan Nashville Public Schools (Metro Schools) launched an ambitious new initiative—Music Makes Us. Building on a multi-year commitment of over $6 million from the Country Music Association's Keep the Music Playing program for instrument purchases, this initiative will establish groundbreaking contemporary music curriculum pathways aligned with the instructional goals of Metro Schools; enhance existing music programs in chorus, band and orchestra; facilitate strong partnerships among the business and nonprofit music communities; and improve the music education infrastructure for students, teachers, and community partners.

To better understand the potential effects and implications of Music Makes Us, the initiative set out to establish a baseline of data about music participation in Metro Schools. To this end, researchers from the University of Kansas were engaged to design and conduct a mixed methods research project, and the following research questions were pursued:

1) ***What relationships exist among music participation, student characteristics, student engagement, and academic achievement?***
2) ***To what extent does music participation affect school motivation and engagement?***
3) ***To what extent does music participation affect academic achievement?***
4) ***To what extent does music participation affect student identity and social structures?***
5) ***To what extent do students make connections between music and other areas of school and life?***

Utilizing both large-scale quantitative data analysis and multiple qualitative research methods, the researchers have begun to identify both larger issues and subtleties surrounding music participation by current students. Quantitative data about high school music participation, school engagement, and academic achievement were collected for all students in the MPNS class of 2012 cohort, whether they attended 1, 2, 3, or all 4 years in Metro Schools (6,006 students). Surveys and focus groups were then conducted with current 5th through 12th grade students to elicit their perceptions of their music experiences in Metro Schools (71 surveys and 93 focus group participants). Together, the data paint a powerful picture of the current status of music in Metro Schools, and creates a foundational understanding on which to build the Music Makes Us initiative.

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Key Findings

Table 1 below presents engagement and achievement indicators for high school students based on three levels of music participation: students who took ***no music*** classes, those who took ***up to 1 year*** of music, and those who completed ***more than 1 year*** of music.

As the data illustrate, music students outperformed their non-music peers on every indicator. All of the differences are statistically significant ($p < .01$)—even those between the two groups of music students. This means that *any* level of music participation is associated with higher engagement and achievement, and that *more* music participation associates with even better outcomes.

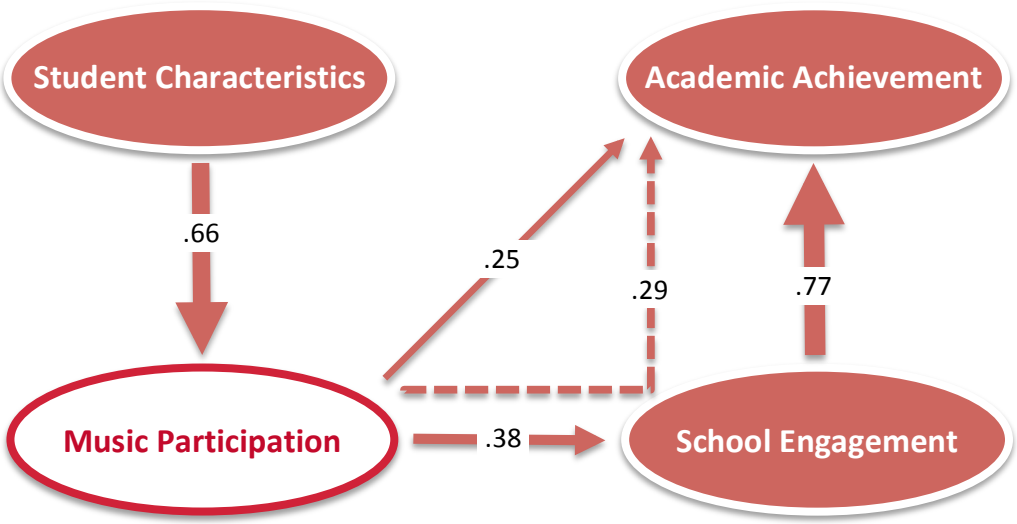
Table 1. Overview of Key Indicators for Students by Music Participation Level

	No Music	≤ 1 Year	> 1 Year
METRO SCHOOLS 2012 Seniors (#)	3,897	1,169	940
Music Participation Level (%)	65%	20%	16%
Attendance Rate (4-year average)	87%	91%	93%
Discipline Reports (4-year average/year)	4.34	3.75	3.23
Grade Point Average (4 point scale)	2.51	2.61	2.89
Graduation Rate (%)	60%	81%	91%
ACT-English Score (average, 36 point scale)	16.95	17.64	19.58
ACT-Math Score (average, 36 point scale)	17.20	17.62	18.67

A substantial body of national research has found that music education has benefits for students, and key studies are presented in the Context section of the full *Prelude* report. However, because Music Makes Us is a new initiative, it was important to establish at the outset that Metro Schools students specifically stand to benefit from expanded music education. For this reason, the researchers used existing data for recent Metro Schools graduates in order to estimate causal relationships between music classes, student engagement, and academic achievement, even at the pre-existing baseline levels of music education in the district, *before* Music Makes Us was launched.

Figure 1, on the next page, presents a basic sketch of the model, with line weights representing the strength and direction of the estimated causal relationships among the variables (see Appendix A for a more detailed version of the model). The left side of the model shows that Student Characteristics have a large direct effect on Music Participation (Regression Estimation = .66). On the right side, School Engagement has an even larger effect on Academic Achievement (.77). While the *direct* effect of Music Participation on Academic Achievement was found to be important (.25), the large effect of Music Participation on Student Engagement (.38) creates a large *indirect* effect on Academic Achievement (.29). All of the direct and indirect effects of Music Participation on the other variables in the model are considered important and consequential by accepted research standards.

Figure 1. Basic Model of the Estimated Impact of Music Participation on School Engagement and Academic Achievement



The statistical analysis represented by the figure above suggests that, even at pre-existing music education levels, there were significant direct and indirect benefits for Metro Schools students. When combined with the prior analysis in Table 1—showing that increased music participation is associated with reduced discipline referrals and increased attendance, grades, on-time graduation, and test scores—the quantitative results support the continued expansion of music courses and access for all Metro Schools students.

In addition to the quantitative data analysis of existing student data, current music students participated in a series of online surveys and focus groups. These qualitative results suggest that music education has a positive effect on student attitudes and behaviors, such as:

- **Music and Identity.** Researchers learned that students who participate in music identify themselves as musicians, and that they perceive the bulk of their "friend group" as also being musicians. This identification may well intensify the positive effects of music participation.
- **Music Habits of Mind.** Students were able to describe a number of positive academic behaviors that they attribute to their participation in music. These behaviors include self-discipline, concentration, persistence, and leadership, all of which can have positive effects on student learning.
- **Music Skills Transfer.** Students also described specific skills learned in music class that they believe transfer to other academic subjects including mathematics, literature, and foreign language.
- **Music as a Motivator.** Participating in music is perceived as a motivator for students to demonstrate positive self-behaviors and to persist toward the learning goals and expectations set by their music directors.
- **Music and Mood.** Students overwhelmingly responded that music class had positive effects on their mood, making them feel happier, relaxed, and accomplished.

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- **Music and the Future.** Students were able to describe the effect of music on their future orientation—how they perceive music's role in their life as they progress through school to careers and beyond.

Taken together with the quantitative results, these qualitative data reinforce the assertion that music participation has a meaningful impact on student engagement and learning, an impact that all Metro Schools students deserve to experience in depth.

Recommendations

Based on the aims of the Music Makes Us initiative and the findings of the study, the following recommendations are proposed for consideration by Music Makes Us and the Metro Nashville Public Schools.

1. **Identify the causes of high school music attrition and develop strategies to reverse it.** Roughly half of the students who are counted as music students in this study take only 1 year or less of music class. Data have shown that extended participation parallels a significant impact on school engagement and academic success. Metro Schools should investigate why the rate of attrition after 1 year of participation in high school music is so high. Once known, Metro Schools should create and implement a retention program that would encourage the continued participation of these students in music classes.
2. **Continue to expand music program offerings and access.** The study finds that participation in music has an estimated positive impact on cognitive, affective, and social aspects in students' lives. Therefore, continuing to expand music offerings and student access will likely benefit more students.
3. **Ensure continuity in choral music for boys across elementary, middle, and high school.** Research has shown that to keep males in choir, there must be seamless participation from elementary through high school, and Metro Schools high school choir participation among male students is about half that of females (Demorest, 2000; Freer, 2007, 2008). Therefore, reinstating a middle school choral program throughout the district could aid in balancing the disparate gender participation levels in Metro Schools choral music programs at the high school level.
4. **Extend the ensemble-building nature of band classes to other music classes.** Qualitative findings indicate that students who participate in band identify strongly with the program—their friends are in band, their primary identification with school is with the band, and they consider the band room a "safe space." Students in Nashville taking music classes other than band could benefit if the ensemble-building aspects of band were replicated in other music programs via teacher professional development regarding how to create this kind of environment in all the music classrooms.
5. **Expand nontraditional music classes to attract a broader range of students.** Although participation levels in traditional music classes (e.g., choir, band, orchestra) are higher for White and Asian students than for African American and Latino students, music participation had significant benefits for all ethnic groups studied. Particular attention should be paid to providing a range of nontraditional music classes as entry points to music for students who may not be drawn to traditional music offerings.

context

About Music Education in American Schools

There is plentiful research evidence supporting the student benefits of music education. A substantial body of literature has found that students enrolled in a comprehensive arts curriculum achieve higher scores on standardized assessment, specifically math, science, and English subtests on proficiency exams (Johnson & Memmott, 2006; Fitzpatrick, 2006; Kinney & Forsyth, 2005). Involvement in music education also has a positive effect on student attendance and retention in school. Students active in music programs have lower rates of absenteeism, tardiness, and dropout. These students tend to possess more positive attitudes toward both their school and community (Catterall, Chapleau, & Iwanaga, 1999), which foster a strong sense of belonging and activity commitment (Bartolome, 2013), as well as a commitment to academic achievement (Smithrim & Uptis, 2005). Participation in music education is associated with increases in self-esteem (Costa-Giomi, 2004), greater connectivity and sense of belonging in one's academic environment (Brown & Evans, 2002), and greater school engagement (Mahoney, Cairns, & Farmer, 2003; Larson, 2000).

Despite this substantial and growing body of evidence, music education has been in steady decline nationwide for decades. Between 1982 and 2008, childhood participation in music dropped by 30% largely due to reductions in school music programs, with the steepest declines for African American and Latino children (Rabkin & Hedberg, 2011, p. 44-46). The arts are a core subject in the federal Elementary and Secondary Education Act, yet it has been argued that the ESEA's emphasis on high-stakes standardized testing has compelled schools to focus instruction narrowly on the tested subjects, relegating music and other core subjects to "enrichment" status or eliminating them altogether (Center on Education Policy, 2005; King & Zucker, 2005; Von Zastrow & Janc, 2004). Thirty-two states codify the arts as core subjects, 45 states require elementary arts instruction, 41 require middle school arts coursework, and 27 require arts coursework for high school graduation (Arts Education Partnership 2012, p. 1). However, with only 18 states requiring arts *assessments* and only a few beginning to consider using a student growth model for teacher evaluations, schools often turn a blind eye to the arts requirements in an effort to meet the high-profile demands of the national accountability system.

About Metro Nashville Public Schools

The Metropolitan Nashville Public Schools (Metro Schools), covering over 520 square miles, is the 41st largest public school district in the United States and currently serves more than 81,000 students in over 150 schools across the district. As the second largest school district in the State of Tennessee, Metro Schools provides educational opportunities for students from a variety of ethnicities and socio-economic levels at the elementary, middle, and high school levels; including alternative schools, exceptional education schools, and charter schools. Districtwide,

45.8% of students are Black/African American, 33.3% are White/Caucasian, 16.6% are Hispanic/Latino, 4.1% Asian /Asian American, and 0.4% Native American and Pacific Islander.

Metro Schools includes schools in inner city areas as well as schools in rapidly growing suburban areas. As the ethnic diversity of Metro Schools' student population has increased during the past 10 years, so has the socioeconomic and language diversity. Currently, among over 56,000 students, 72.4%, of all students are classified as economically disadvantaged, an increase of more than 50% over the past decade. As Nashville becomes one of the most cosmopolitan and diverse cities in the South, the number of Metro Schools students who are Limited English Proficient has more than tripled from 4.7% in 2000 to 14.3% in 2012. According to the Pew Hispanic Center, Nashville has realized, over the past 2 decades, a 446% increase in the Latino population.

About Music Makes Us

In the fall of 2011, in a public-private partnership with Mayor Karl Dean's office, music industry leaders such as The Recording Academy, and philanthropists including Martha Ingram, the Metropolitan Nashville Public Schools launched an ambitious new initiative—Music Makes Us. This initiative will establish groundbreaking contemporary music curriculum pathways aligned with the instructional goals of Metro Schools; enhance existing music programs in chorus, band and orchestra; facilitate strong partnerships among the business and nonprofit music communities; and improve the music education infrastructure for students, teachers, and community partners.

In 2012-2013, its inaugural year, the Music Makes Us initiative took some important first steps. The district has launched 22 new contemporary music curriculum classes in 13 middle and high schools in a variety of genres to appeal to Metro Schools' student diversity—including classes such as Hip Hop, World Percussion, Mariachi, and Rock Band, among others. Instructors with both teaching and performing experience are being brought in to lead these new courses (see Appendix for listing of courses). One school launched its own record label and a state-of-the-art recording studio onsite in partnership with Warner Music Nashville and The Recording Academy Producers & Engineers Wing, so that students can gain practical experience with all aspects of the music industry. These innovations are not, however, coming at the expense of traditional music courses. In fact, Metro Schools Board of Education adopted a resolution in January 2013 affirming the importance of music and the arts for all students. Band programs have been restored in three middle schools; all middle school students now have the opportunity to study band. New technology is being implemented in all middle and high schools with SmartMusic. A first-ever Teacher Advisory Council has been formed that advises on professional learning needs. Millions of dollars have been donated through the Country Music Association's Keep the Music Playing program to provide stringed instruments, band instruments and pianos, as well as a new in-house instrument repair facility. Further, the district is embarking on a groundbreaking student growth evaluation model for music and arts educators.

methods

Purpose of the Study

The purpose of this study was to establish a baseline understanding of the extent to which music participation makes a difference for Metro Schools students. To determine the effect of music participation on student engagement and academic achievement, the following research questions were pursued:

1) What relationships exist among music participation, student characteristics, student engagement, and academic achievement?
2) To what extent does music participation affect school motivation and engagement?
3) To what extent does music participation affect academic achievement?
4) To what extent does music participation affect student identity and social structures?
5) To what extent do students make connections between music and other areas of school and life?

Participants

The study consisted of three components, described further in the methodology section below. The first component was a statistical analysis of 4 years' worth of data for students who were high school seniors in 2012. The second component was a set of qualitative online surveys, and the third was a series of focus groups. The statistical analysis included data for both non-music and music students, while the surveys and focus groups were conducted with music students only.

Figure 2. Study Participants by Research Method

	# of Participants	Grade Levels
Non-Music & Music Student Data Analysis	6,006	Grades 9-12*
Music Student Surveys	71	Grades 5-12
Music Student Focus Groups	93	Grades 5-12

** All participants were 2012 seniors, however the data spanned their grade 9-12 experience.*

Participant sampling for both the check-in surveys and focus groups was conducted via convenience sampling. Music educators in the district were asked to distribute and collect permission forms from students whom they perceived would be willing participants in the online surveys. These students were then contacted by email and provided Internet links to each survey. Reminder emails were also sent, to ensure the highest participant percentage possible.

Focus Group participants were recruited in similar fashion. District music educators were asked to volunteer both a portion of their class time and access to students who would be willing to participate in the focus group conversations. Classes were chosen to attain a mixture of both new and traditional music offerings, a variety of school settings, and multiple student ages from 5th through 12th grade. No demographic or identifying information was gathered from or about the survey and focus group participants.

Quantitative Methods

Two key quantitative approaches were used to analyze the data from the population of 6,006 Metro Schools students: 1) an analysis of variance to determine differences in student engagement and achievement by music participation level, gender, and ethnicity; and 2) structural equation modeling (SEM) to determine the estimated causal relationships among the variables in the study.

Analysis of Variance

The data for each student were averaged over their time in Metro Schools high schools—whether that was 1, 2, 3, or 4 years—so that the analysis considered the cumulative picture of each student's experience. While there were 6,006 students in the full data set, the number of students included in each analysis depended on the scope of each variable and the available data. For example, the analysis of gender-related differences used the full 6,006 students, while the analysis of ethnicity-related differences was limited to the 5,742 students who identified in the four predominant ethnic groups: African American, White, Latino, and Asian. By grouping the students into three participation levels (no music, ≤ 1 year of music, and > 1 year of music), it was possible to study the relationship between music participation across the key indicators of student engagement and achievement: attendance, discipline, GPA, on-time graduation, and ACT scores in English and Mathematics.

Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical technique used to test and estimate causal relationships between variables using a combination of statistical data and theoretical assumptions.

The district provided the researchers with de-identified student data for all 6,006 students who were part of the Metro Schools class of 2012 cohort at any point between 2008 and 2012. From among the extensive data set provided, the key data points used from these central records included: Socioeconomic Status data, 4th Grade Basic Skills Test Scores (used as covariates), Music Enrollment, School Attendance, Graduation Rates, Disciplinary Reports, ACT Scores, and final Grade Point Average. These data were then grouped into the following categories of Latent

Variables: Student Characteristics, School Characteristics, Music Participation, School Engagement, and Academic Achievement.

The approach to the study involved first theorizing and then confirming the relationships among these five Latent Variables. The first step was to create an original model of these relationships based on previous literature and theoretical assumptions. For example, prior research made it reasonable to project that Student Characteristics would affect School Characteristics, Music Participation, School Engagement, and Academic Achievement. School Characteristics, while believed to be influenced by Student Characteristics, were not expected to affect Student Characteristics in the other direction. School Characteristics do, however, have theoretical effects on Music Participation, Student Engagement, and Academic Achievement. Music Participation is thought to affect the way students engage in their school and have an effect on students' Academic Achievement. It is also theorized that if students are deeply engaged in their school experience, that engagement will have a substantial impact on the student's Academic Achievement.

Once the original theoretical model of the relationships was created, it was tested by running the student data through various statistical procedures. The model was then refined until a satisfactory model was obtained that captures the most likely relationships among the variables. Additional details about the criteria used to refine the model, and other quantitative methods applied in this study are described in depth in Appendix A. It is important to note that the model generated by the SEM process is designed to estimate causal relationships and causal assumptions that are both informed and supported by data, rather than validating causality through an experimental study.

Qualitative Methods

Two methods of qualitative data collection were used in this baseline report—surveys and focus groups—the results of which were interpreted using content analysis techniques.

Student Surveys

Data were collected via a set of four bi-weekly check-in surveys, and 198 surveys were completed by 71 students. The surveys were designed to 1) assess the role of music in students' daily lives; 2) gauge the effect of music classes on students' cognitive, affective, and social growth, and the application and utility of this growth in other areas of school and life; and 3) determine students' plans to continue on in music. Student check-in surveys provided quantitative, rating-scale information regarding student perceptions of success and academic confidence. The survey questions addressed students' perceptions of their own abilities to be academically successful, and of the impact of music education on their motivation and learning in other areas of school. The surveys posed a series of five recurring questions/statements on a rating scale, as well as open-ended questions that changed each week (see Appendix B for the full list of survey items).

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Student Focus Groups

Researchers also conducted eight focus groups with 93 students from various Metro Schools middle and high schools. The focus groups were selected from a wide variety of music classes, ranging from Guitar to Rock Band to general music. The students who participated in focus groups were randomly selected from these music classes or, in the case of smaller classes, the entire class participated. The focus groups were conducted with middle and high school students currently enrolled in Metro Schools, and therefore did not overlap at all with the 2012 seniors included in the quantitative data analysis (see Appendix C for the focus group protocol).

Content Analysis

The transcribed focus group responses and open-response survey questions provided the data for this portion of the study. An inductive approach to analysis was used, to allow categories, patterns, and themes to emerge from the data itself, rather than imposing a predetermined theoretical framework on the data. In the tradition of Glaser and Strauss, the data were analyzed using the constant comparison method (Merriam, 1998). This method necessitates that the researcher compare an incident from one focus group or survey response to other incidents in the same or other responses, which leads to tentative categories, and eventually to themes and patterns.

findings

The findings of the study are organized below by key variables in the quantitative analysis, and by emergent themes in the qualitative analysis. Much of the quantitative analysis grouped the students into three categories by music participation level:

- Students who took no music classes at all;
- Students who took music for 1 year or less; and
- Students who took music for more than 1 year.

The quantitative analysis also considered gender- and ethnicity-related differences, which are presented here as well.

For the Structural Equation Modeling process, students were not divided into the three groups above; rather, their music participation levels were analyzed in their original form, e.g., the actual number of semesters of music taken.

In the qualitative analysis, data from all survey and focus group participants are presented together, reflecting a synthesized perspective of music students.

Music Participation Rates

Thirty-five percent of the students in the Metropolitan Nashville Public Schools took at least one music class during their time in high school toward fulfillment of the 1-year fine arts requirement in Metro Schools. This requirement may account for both the relatively high number of students who took music, and the fact that roughly half of music students took the 1-year minimum requirement or less.

Figure 3. High School Music Participation of Metro Schools Class of 2012 *(N=6,006)*

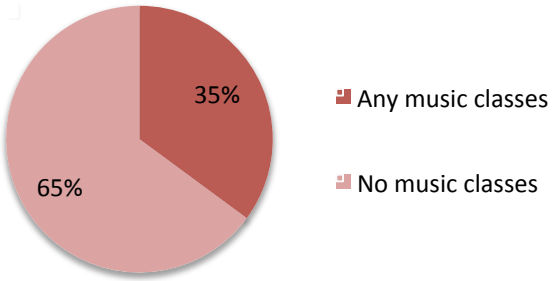
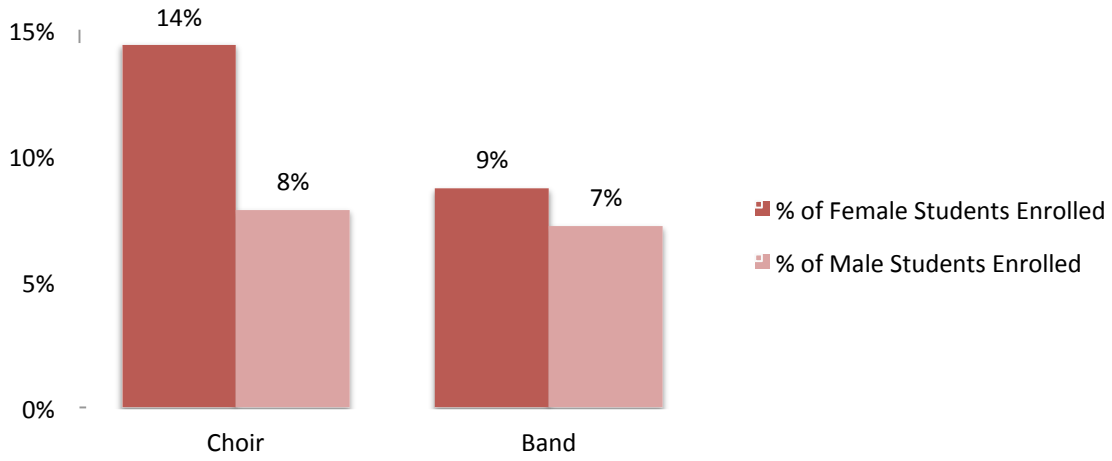


Figure 4, below, compares the participation rates of male and female students in choir and band classes. Female students participated in choir at a rate nearly twice that of male students (14% and 8% respectively), while the band participation rates are more closely matched.

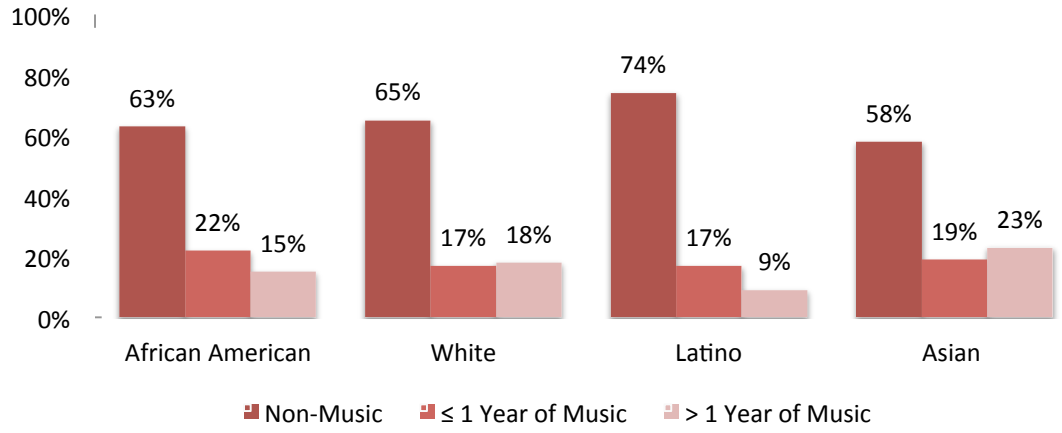
Figure 4. Comparison of Choir and Band Participation Rates by Gender *(N=6,006)*



Though females often outnumber males in choral programs, this ratio is considered unusually high by the researchers. However, the Nashville school district has very few middle school choir offerings in their schools. Extant research indicates that, to keep males in choir, participation must be continuous from elementary school through high school (Demorest, 2000; Freer, 2007; 2008). If a male student does not maintain his membership in choir, he rarely returns the next year. Research suggests that, if a male does not have continuous vocal music training during those years when his voice is changing, he will lose interest in singing.

Differences in music participation were noted across the four primary ethnicities represented in the Metro Schools. Figure 5 shows differences in the percentage of students who did not participate in music classes compared with those who participated for 1 year or less, and students with more than 1 year, broken down by student ethnicity.

Figure 5. Music Participation Rates by Ethnicity *(n=5,984)*

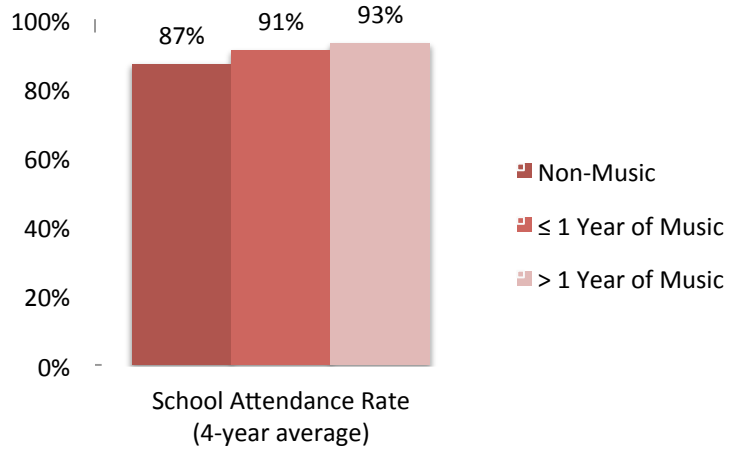


Though there are clearly some differences among participation levels across the ethnic groups, perhaps the most apparent is the small percentage of Latino students who participated in music for more than 1 year (9%). The next smallest percentage in this category is the African-American students (15%), followed by White students (18%) and Asian students (23%). These differences in music participation were statistically significant at the $p < .001$ level.

School Attendance

Figures 6 illustrates that Metro Schools high school students who participate in music education have fewer absences than their non-music peers. This is even more so for the students who took more than 1 year of music classes. These differences are statistically significant ($p < .01$).

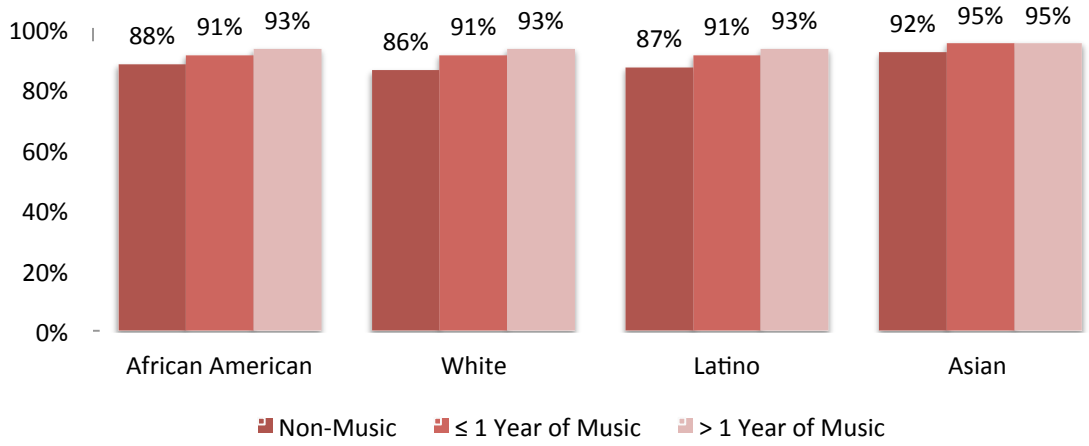
Figure 6. School Attendance Rates by Music Participation Level *(n=5,742)*



With regard to the overall attendance rates, students who took no music classes during their high school experience attended class 87% of the time. In contrast, students who took at least 1 year or less of music coursework attended school 91% of the time, while those taking more than a year attended school at a rate of 93%. In a 180-day school year, that is a difference of 11 school days (more than 2 weeks of class).

Figure 7 depicts school attendance rates for all four ethnicities of students broken out by their music participation level.

Figure 7. School Attendance Rates by Ethnicity *(n=5,742)*

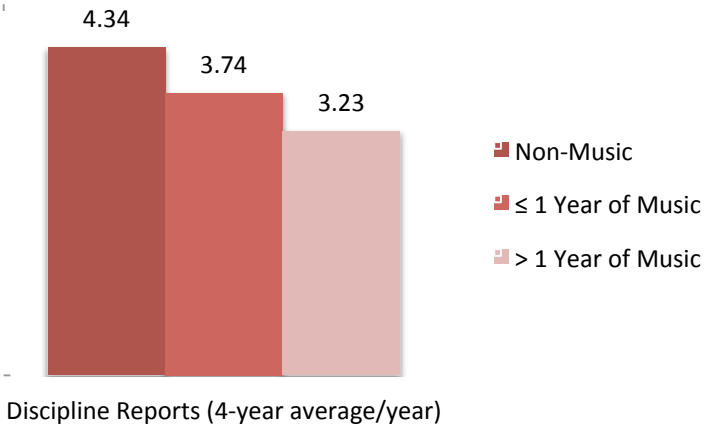


In general, attendance rates increase from non-music students to music students and the more music a student takes, the more attendance rates increase. Because attendance rates were averaged over 4 years, the study did not take into consideration whether attendance rates changed in any way while students were actively enrolled in music classes. The differences in school attendance between non-music and music students for all ethnicities are statistically significant at the $p < .01$ level.

Discipline Referrals

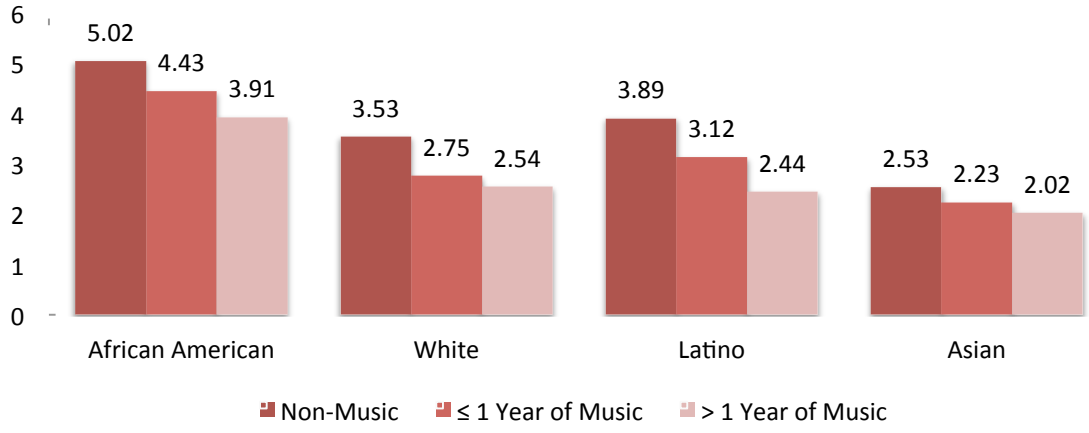
As seen in Figure 8, music participants also receive fewer referrals for disciplinary action, also a statistically significant difference ($p < .01$). Students who took no music classes during their high school experience were referred an average of 4.34 times for discipline issues, while in contrast, students who took up to 1 year of music coursework were referred 3.74 times, and those who took more than 1 year of music were referred at the lowest rate of 3.23 times per year.

Figure 8. Discipline Reports by Music Participation Level *(n=4,490)*



Across all four ethnicities, students with no music classes had the highest average number of discipline referrals each year, followed by the group of students who had 1 year of music or less, while students who had more than 1 year of experience had the fewest referrals. Asian music students received about .5 fewer referrals than their non-music peers, White and African American music students received on average 1 less referral per year than their non-music peers, and Latino music students received 1.5 fewer referrals per year than their non-music peers. These results are presented in Figure 9.

Figure 9. Discipline Referrals by Ethnicity *(n=4,490)*



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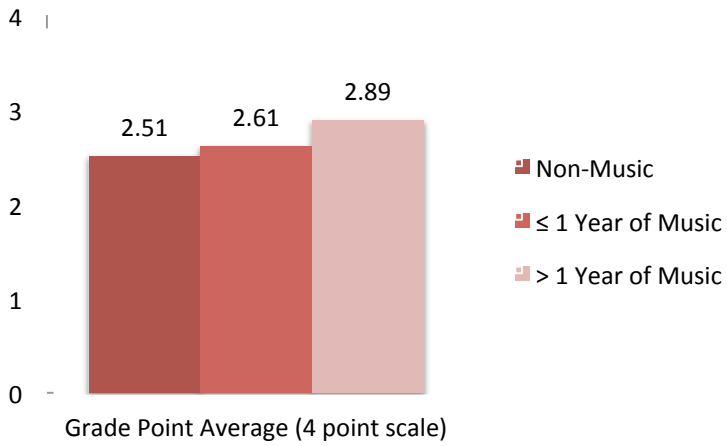
The differences in discipline referrals between non-music and music students are statistically significant at the $p < .01$ level for all ethnicities except Asian students. It is important to note that the analysis of discipline referrals did not take into account the nature of the discipline referrals.

Grade Point Average

The study found that music students in the Metro Schools have significantly higher grade point averages and graduation rates in comparison to non-music students ($p < .01$).

Figure 10. Grade Point Average by Music Participation Level *(n=4,119)*



Non-music students earned a grade point average of 2.51, students with up to 1 year earned a GPA of 2.61, and students with more than 1 year of music earned a 2.89 grade point average. When looking at these data vis-à-vis districtwide GPA data for the same year, students who participated in music for more than 1 year averaged in the 65th percentile of the GPA, while students who participated 1 year or less averaged in the 50th percentile and students with no music classes averaged in the 44th percentile.

Figure 11. Grade Point Average by Ethnicity *(n=4,119)*

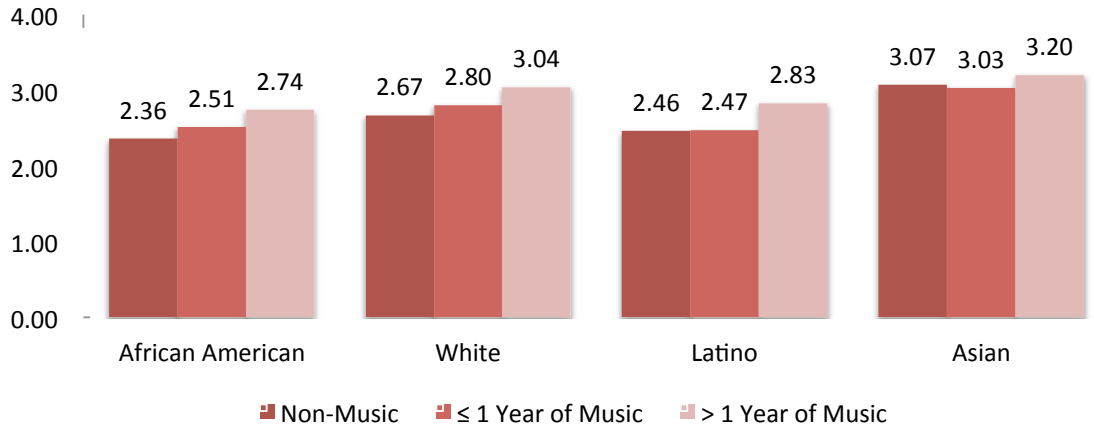
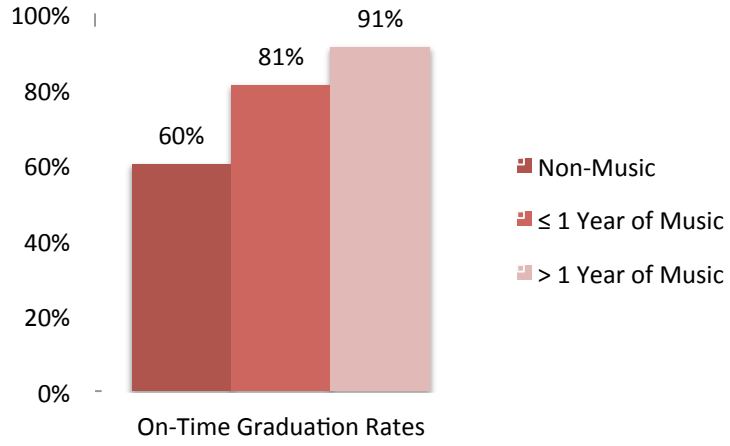


Figure 11 above illustrates that, across all ethnic groups, students with the highest music participation levels also earned the highest GPAs. The differences in GPA between non-music and music students for all ethnicities are statistically significant at the $p < .01$ level.

Graduation Rates

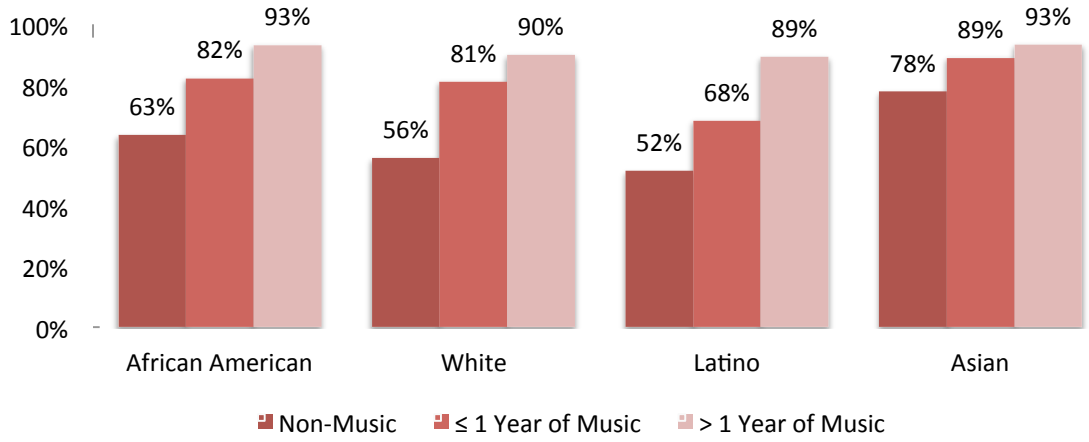
As depicted in Figure 12 below, students who participated in up to one year of music had a 21% higher on-time graduation rate than non-music students, while those with more than 1 year of music have a 31% higher on-time graduation rate than their non-music peers. These increases are statistically significant at the $p < .01$ level.

Figure 12. On-Time Graduation Rates by Music Participation Level *(n=4,994)*



The overall patterns for on-time graduation rates are sustained when the data are broken down by ethnicity, as seen in Figure 13 on the next page.

Figure 13. On-time Graduation Rates by Ethnicity *(n=4,994)*

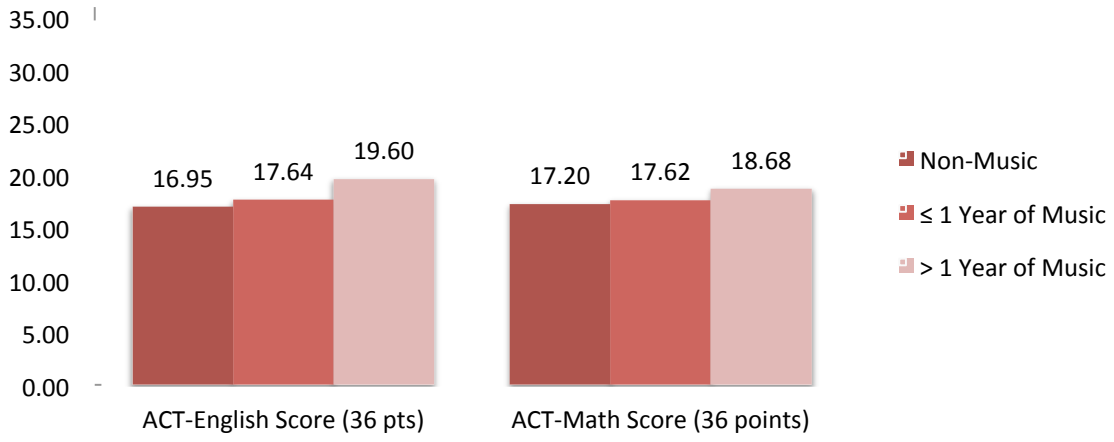


The music-related graduation gap was greatest for Latino students and White students (37% and 34%, respectively). This difference means that Latino high school students who exceed the district's fine arts requirement by taking more than 1 year of music are 71% more likely to graduate on time than their Latino peers without any music. The differences in on-time graduation rates between non-music and music students for all ethnicities are statistically significant at the $p < .01$ level. Further, there is a statistically significant increase in graduation rates as music participation increases ≤ 1 year to > 1 year, as well ($p < .01$).

Test Scores

Figure 14, below, illustrates that Metro Schools high school students who participate in music education scored higher on English and Math subtests of the ACT than their non-music peers. These increases are statistically significant at the $p < .01$ level.

Figure 14. ACT Scores by Music Participation Level *(n=3,462)*



Students who took no music classes during their high school experience scored in the 35th percentile on the ACT–Math, while students who took up to year music scored on average in the 38th percentile, and those with more than 1 year of music scored in the 45th percentile on average. Figures 15 and 16 illustrate that African American, White, and Latino students with higher music participation levels all scored higher on the ACTs. These differences were statistically significant for African American and White students ($p < .01$).

Figure 15. ACT-English Scores by Ethnicity (36 point scale) *(n=3,462)*

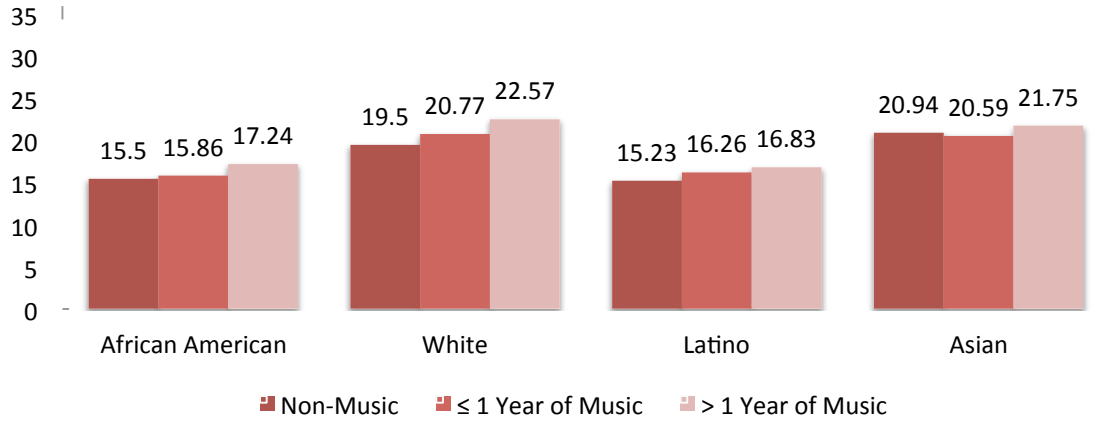
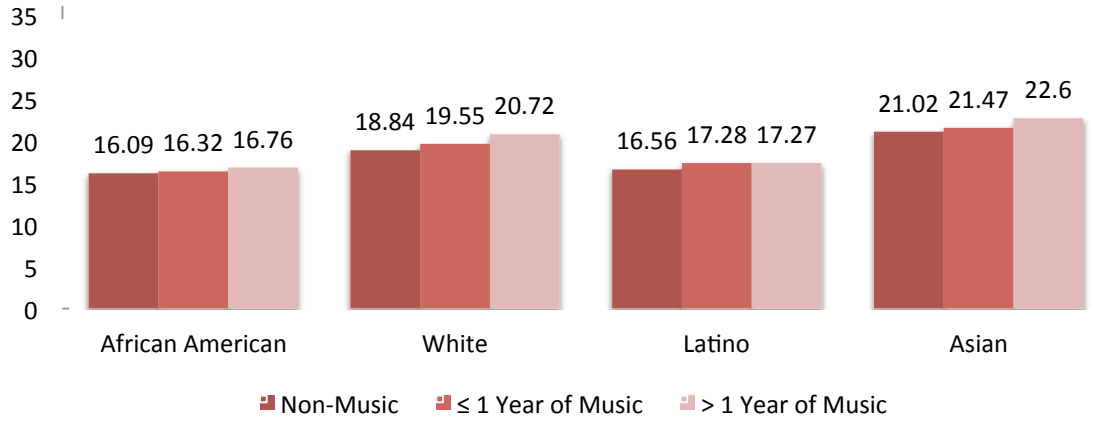


Figure 16. ACT–Mathematics Scores by Ethnicity (36 point scale) *(n=3,461)*



In general, these differences across the three groups do show some substantial overall difference between students who took no music classes, those who took classes for 1 year or less, and those who took more than 1 year of music classes. There were some differences between students from different ethnicities, but in no cases was participating in more music contraindicated—in fact, quite the opposite. In almost every group case, and by almost every measure, students who participate in more than 1 year of music study are most successful in the Metro Schools.

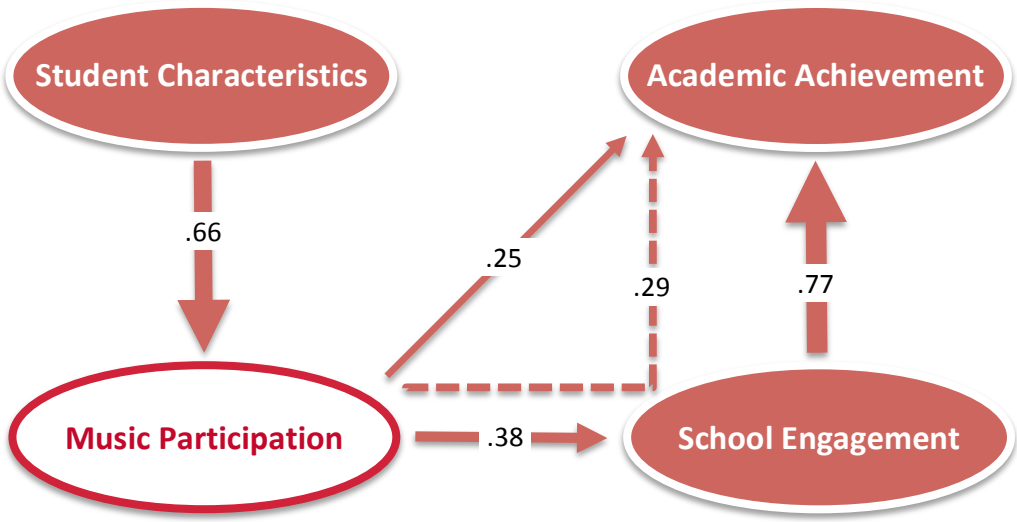
Estimated Impact of Music Participation

As noted in the methods section, a key component of the study was to develop a statistical model estimating the causal relationships among music participation and student engagement and achievement. This model tested four paths of causal relationships among the variables, and found important estimated effects for each path.

Figure 17, below, presents a basic sketch of the model, with line weights representing the strength and direction of the estimated causal relationships among the variables (see Appendix A for a more detailed version of the model). To interpret effect sizes in the model, the following rule of thumb is generally used: .10 ≈ small effect, .30 ≈ medium effect, and .50 ≈ large effect. In general, .20 is the threshold for an effect to be considered substantively important (Little, 2013).

The left side of the model shows that Student Characteristics have a large direct effect on Music Participation (Regression Estimation = .66). On the right side, School Engagement has an even larger effect on Academic Achievement (.77). While the direct effect of Music Participation on Academic Achievement was found to be important (.25), the large direct effect of Music Participation on Student Engagement (.38) results in a large *indirect* effect on Academic Achievement (.29, depicted by the dotted line). All of the direct and indirect effects of Music Participation on the other variables in the model are considered important and consequential by accepted research standards.

Figure 17. Basic Model of the Estimated Impact of Music Participation on School Engagement and Academic Achievement

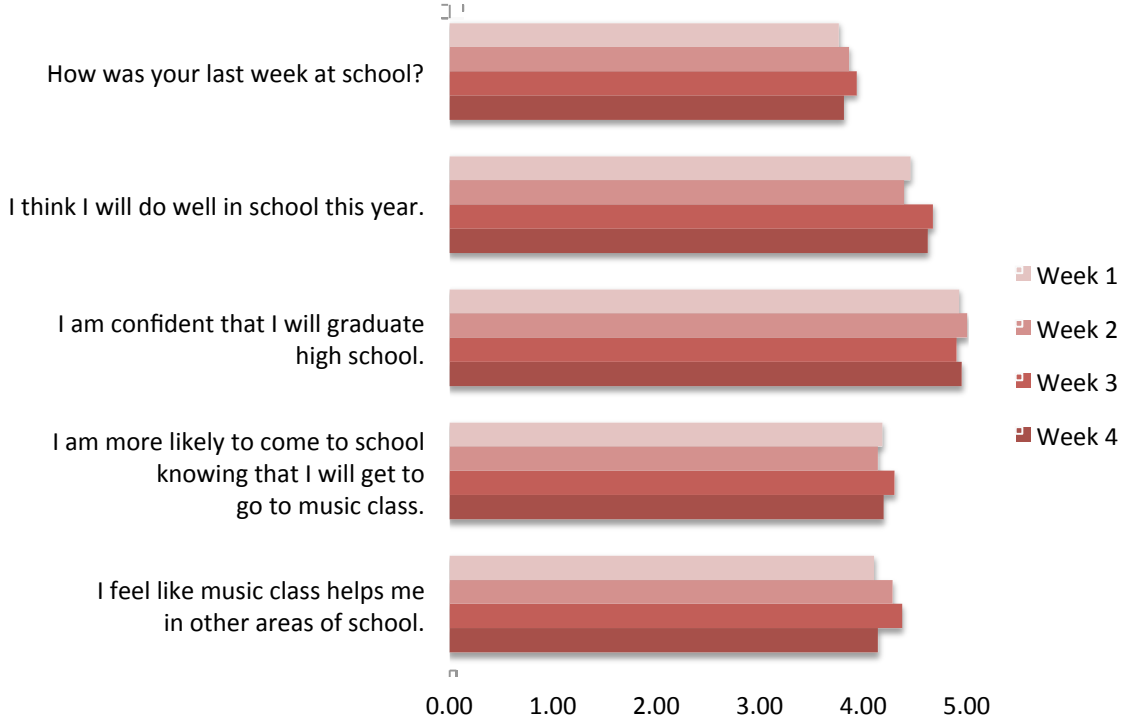


The statistical analysis represented by the figure above indicates that, even at pre-existing music education levels, there were significant direct and indirect benefits for Metro Schools students. When combined with the prior data analysis—illustrating that increased music participation is associated with reduced discipline referrals and increased attendance, grades, on-time graduation, and test scores—the full quantitative findings support the continued expansion of music courses and access for all Metro Schools students.

Student Attitudes and Engagement

Metro Schools secondary students participated in a qualitative survey inviting them to rate their outlook on school, confidence around graduation, motivation to attend school, and the transfer of music skills to other subjects. The students' responses to the rating scale are presented in Figure 18 below.

Figure 18. Music Student Survey Results for School Attitudes and Engagement



As evident above, participating music students gave positive ratings across the five survey indicators, suggesting high levels of self-concept, confidence, and motivation. The students also hold a strong positive perception of the applicability of music learning to other areas of school. Comparison data were not collected from non-music students; therefore, it is not possible to report whether these strong positive outlooks and associations are unique to music students in Metro Schools.

The survey also included open-ended questions asking students to reflect on their music participation through academic, cognitive, affective, and social lenses. These open responses were analyzed in conjunction with the focus group data, and these synthesized results are presented below by theme, with illustrative student quotations provided in the margin. (See Appendix B for the full survey, and Appendix C for the focus group protocol.)

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Music and Identity

Through the focus groups and survey, researchers discovered that Metro Schools students consistently used their participation in music as a means of identification. A vast majority of responses from students regarding how they would describe themselves to others included some information about their involvement with music classes, performing music, or their love for music. Furthermore, students who participated in focus groups identified their friend groups as also participating in music. High school students in particular noted that they had been friends before being in music together, and indicated that music participation had solidified those friendships.

I am a musician. Yeah. We call ourselves musicians.

I like Band because you get connected because you all like to play something, and then it just makes you friends.

In response to a query about what students would like to see change in their music courses, many students expressed a desire for longer classes that occurred more often, more challenging pieces, and more performance opportunities. This demonstrates students' desire to continue to challenge themselves and grow as musicians. Such responses are highly reflective of the discipline and motivation gained from participation in music classes, and also to the integration of "musician" into the students' identities. Metro Schools students are not satisfied with just participating in music, but strive to challenge themselves and become "skilled musicians". These responses illustrate how important musicianship is to students participating in music education in the Metro Schools system.

Band has shown us that you have to commit to something.

I tell them that I have a passion for music, and that I love to sing!

The intensity with which these students identify themselves with their participation in music classes gives us clues to the significance that music plays in their academic lives. These students mentioned music as part of their identity, and described themselves as such with such frequency, so as to underscore music's importance to them, as persons and as students. These students, however, appear to see their identity as musicians as significant.

At the end of the day, if we're burned out, we come here. All our friends are here. It's home. Most kids who aren't in band don't have that opportunity.

Music Habits of Mind

Metro Schools students were perceptive in their description of the traits they believe they have learned by participating in music classes. Self-discipline and self-control were the most common character traits mentioned, but others such as teamwork, respect, following instruction, confidence, persistence, helpfulness, attentiveness, commitment, responsibility, and leadership were frequently mentioned by

It helps me with self-control.

students as well. These findings align with other research that has examined the relationship between participation in music courses and student behaviors, and can provide additional evidence to this body of literature (Larson, 2000; Mahoney, Cairns, & Farmer, 2003; Simpkins, Vest & Becnel, 2010).

Leadership is something that I learned fully in band that has definitely helped me in regular class.

Music Skills Transfer

While learning music and gaining music-related skills are, in and of themselves, worthwhile activities, researchers wanted to know if the students perceived gaining any skills that transferred to the rest of the curriculum. Without exception, the focus group participants were able to give examples of attributes learned in music that were of benefit to other academic subjects. Most commonly mentioned was Mathematics; students regularly expressed the belief that music provided a foundation for both the discipline and skills involved in learning Math.

It helps me with counting and dividing.

The ability to listen to other people and work as a group has definitely been a skill that I mastered in band that I've used everywhere.

Students also felt like they were able to contextualize their history lessons with different musical periods, and that their vocabulary improved because of learning musical terminology. Students also made connections between the knowledge gained in music courses and its applicability to foreign language, sharing that performing songs written in different languages has helped them in their foreign language classes.

Many students mentioned that the same behavior traits they gained from music class were also helpful in other classes, and outside of the school setting all together. Self-discipline was the most significant transferrable behavior, expressed often as the ability to follow the rules, stay focused, and remain calm in stressful environments. Students reported that their music classes allowed them to be more expressive, and helped them to identify strengths in their character. What appears to have started as an expectation of their directors for their behavior in music classes has become a skill they can use in multiple situations.

Learning how to read music has been very beneficial to me in other subjects. I feel like it has helped my concentration and attention span.

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Music as a Motivator

Music in general, and Band in particular, are key motivators for attending and succeeding in school. Students consistently report that getting to participate in music class inspires them to come to school, even on days when they would rather not.

The quantitative study would indicate that there is a connection between participation in music classes and consistent attendance at school. The comments from these focus groups and surveys clearly support that premise.

Several course-specific motivators—teacher expectations, a sense of responsibility to self and classmates, and general enjoyment of the class—compel students to attend, even on days when they might otherwise be inclined to stay away.

I feel more focused and ready for my other classes [as a result of music classes].

On the days I do have something music related, I am much more willing to get out of bed than days I do not have music classes.

I have days when I'm so tired that I don't want to come to school, but then I think of strings and come anyway.

Music and Mood

Students overwhelmingly responded that music class had positive effects on their mood, making them feel happier, relaxed, and accomplished. Several students shared that participation in music classes provides a release from daily stresses and worries.

Reflective of the previously cited research (e.g., Bartolome, 2013), many Metro Schools students reported that music classes provided them with a sense of belonging, and a place where they could feel confident and at peace within their school environments.

I feel relaxed and happy, and feel very good about myself.

I feel like I've accomplished something. It is very rewarding. I feel recharged, full of energy, and happy.

I generally feel significantly more content with life. There's just something about music that improves my mood immensely.

Music and the Future

Perhaps not surprisingly, given how many students identified themselves as musicians, the students we spoke to intended to stay involved in music, both for the short run and the long run. For many middle school students, participation in choir is an optional afterschool activity; many would like to take it as a class when they move up to high school. However, if forced to choose between choir and band, the band students intend to stay with their instrument. Several mentioned wanting to branch out to different instrumental options, like jazz or marching band. Again, however, the focus was to continue participating in instrumental music.

I want to keep music in my life.

I want to go to Curtis Institute or DePaul or Juilliard and major in music performance and become a symphony musician. Band has really set that for me. If you're going to do something, do it right and go for the big picture.

Student commitment is further exhibited through their plans to continue involvement in music over the summer by participating in music camps, music festivals, and summer art and music programs. Even the middle school students were prepared to think about music beyond their high school years. Some thought that their career plans might interfere with continuing to play, but other participants intended to stay involved with music for the long-term. Both middle and high school students saw excelling in music as a pathway to higher education. This future orientation to continued involvement in music is representative of the vital role that music education plays in the lives of these students, as well as the passion that these students possess for music, learning, and performing.

Limitations

There are several limitations to this investigation that should be noted.

- Data used for the quantitative portion of the investigation were from school records, which are likely to have random errors that would be impossible to identify or correct. Even so, the research team believes that the impact of these data errors would be statistically trivial given the large sample size (6,006 students).
- The Structural Equation Modeling (SEM) used in this study is a data analysis technique, not a research design. It was used in this project to shed light on the potential effects of higher levels of music participation on students. SEM is an accepted method of estimating and predicting causal relationships, though it does not claim to replace experimental design in terms of confirming causality. SEM is a valuable tool for prediction when variables are considered appropriately, and should likely be limited to conditions where true experimental designs are not possible, which is the case with this descriptive baseline study.

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- The analyses of variance (ANOVAs) used in this study simply report differences between non-music and music students. They do not inherently have any mechanism to explain causation of differences beyond the independent variables entered into the test. Therefore, it is possible that other factors are also at play in the student outcomes.
- Some level of reservation should be exercised when using the qualitative data in this project to elucidate the quantitative results. The quantitative data were collected from students who were high school seniors in 2012, and the qualitative data were collected from students in the class of 2013 and beyond.
- The qualitative data collection focused on music students only. Therefore, it is not possible to compare their perspectives on school engagement, for example, with those of non-music students.
- Because identifying information was not collected for the survey or focus group participants, it is not possible to provide a breakdown of these participants by grade level. Further, it is unknown whether there was overlap between the survey and focus group participants.

In weighing these limitations against the results of the study, the researchers conclude that there is sufficient compelling evidence to suggest that higher levels of music participation are predictive of statistically significant positive benefits for student engagement and learning.

conclusions

The conclusions of the study are presented below in response to the research questions:

1) ***What relationships exist among music participation, student characteristics, student engagement, and academic achievement?***

   Using structural equation modeling (SEM), researchers found that music participation has a large direct effect on school engagement (.38) and both an important direct effect (.25) and a large indirect effect (.29) on academic achievement. School engagement was found to have a large direct effect on academic outcomes for students (.77). Overall, the researchers conclude that increased music participation has important direct and indirect effects on positive outcomes for Metro Schools students.

2) ***To what extent does music participation affect school motivation and engagement?***

   Students who participate in music in Metro Schools high schools have higher attendance rates, receive fewer discipline referrals, and have higher on-time graduation rates than their non-music peers. Participation in music was identified as a motivator for attending and succeeding in school and improved the mood of students, who reported feeling happier, more relaxed, and more ready to take on the rest of their day as a result of music classes.

3) ***To what extent does music participation affect academic achievement?***

   Music students outscored their peers on academic indicators, including grade point average and the ACT in both English and Mathematics. All tests that showed these academic gains had already removed differences that existed prior to music participation (e.g., fourth grade standardized test results were entered in as covariates in the model).

4) ***To what extent does music participation affect student identity and social structures?***

   Researchers learned that students who participate in music identify themselves as musicians. This identification may well intensify the positive effects of music participation (Bartolome, 2013; Brown & Evans, 2002). Findings from both the surveys and focus groups demonstrate that students perceive their participation in music as an important part of both their personal and social identities at school.

5) ***To what extent do students make connections between music and other areas of school and life?***

   Students described a number of positive habits of mind associated with their participation in music, and ways in which these traits can and are transferred to improve learning in other academic areas. Students were able to describe the effect of music on their future orientation—how they perceive music's role in their lives as they progress through school and beyond.

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recommendations

Based on the aims of the Music Makes Us initiative and the findings of the study, the following recommendations are proposed for consideration by Music Makes Us and the Metro Nashville Public Schools.

1. **Identify the causes of high school music attrition and develop strategies to reverse it.** Roughly half of the students who are counted as music students in this study take only 1 year or less of music class. Data have shown that extended participation parallels a significant impact on school engagement and academic success. Metro Schools should investigate why the rate of attrition after 1 year of participation in high school music is so high. Once known, Metro Schools should create and implement a retention program that would encourage the continued participation of these students in music classes.

2. **Continue to expand music program offerings and access.** The study finds that participation in music has an estimated positive impact on cognitive, affective, and social aspects in students' lives. Therefore, continuing to expand music offerings and student access will likely benefit more students.

3. **Ensure continuity in choral music for boys across elementary, middle, and high school.** Research has shown that to keep males in choir, there must be seamless participation from elementary through high school, and Metro Schools high school choir participation among male students is about half that of females. Therefore, reinstating a middle school choral program throughout the district could aid in balancing the disparate gender participation levels in Metro Schools choral music programs at the high school level.

4. **Extend the ensemble-building nature of band classes to other music classes.** Qualitative findings indicate that students who participate in band identify strongly with the program—their friends are in band, their primary identification with school is with the band, and they consider the band room a "safe space." Students in Nashville taking music classes other than band could benefit if the ensemble-building aspects of band were replicated in other music programs via teacher professional development regarding how to create this kind of environment in all the music classrooms.

5. **Expand nontraditional music classes to attract a broader range of students.** Although participation levels in traditional music classes (e.g., choir, band, orchestra) are higher for White and Asian students than for African American and Latino students, music participation had significant benefits for all ethnic groups studied. Particular attention should be paid to providing a range of nontraditional music classes as entry points to music for students who may not be drawn to traditional music offerings.

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appendices

Appendix A | Expanded Quantitative Methodology

The purpose of this project was to examine the relationships among music participation and student school engagement and academic achievement in the Metropolitan Nashville Public School district.

Data Set

The Metropolitan Nashville Public Schools (Metro Schools) is a large urban district in the center of the United States. The District has over 81,000 total students from more than 100 different countries, speaking more than 135 different native languages. There are more than 150 schools in the system, including more than 20 high schools. This district provided the researchers with de-identified student data for all students who were enrolled in Metro Schools in 9th grade in 2008. The total *N* for the students was 6,006. By obtaining data for 9th grade students four years ago, we were also able to obtain graduation, delayed graduation, and drop out data. The student data provided were extensive, but the most cogent aspects of the data that were used from these central records are shown on Table 1. These observed categories of data were then placed into the model where the researchers hypothesized they most closely interacted to create a complete variable picture, called a Latent Variable.

Latent Variables

Student Characteristics included gender, ethnicity, and socioeconomic status. The elementary school environment, where that student went to school, and that school's characteristics, are theorized to be additional indicators for this latent variable. Finally, previous research has indicated that the type of student who takes up music when it becomes an elective is one who is doing well in school (Kinney, 2010, 2013). To control for the possible effect of this predilection, fourth-grade standardized test scores were included as covariates in this latent variable.

School Characteristics examined included size of the school, percentage of ESL students, and the percentage of students on free and reduced lunch. These three indicators are theorized to be reflections of overall school characteristics.

Music Participation indicators include the number of semesters of the type of music in which the student was enrolled and how many total semesters of music the student took. An attempt was made to determine a musical dose indicator—an assessment of the quality of the musical education inherent in each class and how many semesters of each class each student experienced—but this measure was determined to be too subjective for this stage of the research.

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School Engagement in this study was based on each student's attendance at school, the number and severity of discipline reports each student has in their record, and whether or not the student would graduate from high school on time, graduate late, transfer out of the system, or drop out.

Academic Achievement was examined through English and Math scores from the standardized tests taken in the 12th grade, which in Metro Schools is the ACT, as well as high school grade point average.

Table A-1. Latent and Observed Variable List

Student Characteristics
Gender
Ethnicity
Socioeconomic Status (Free/Reduced Meals Rate %)
Elementary school characteristics the student attended
4th grade basic skills test scores (pretest data)
School Characteristics
Size (School Enrollment)
Socioeconomic Status (Free/Reduced Meals Rate %)
English as a Second Language (ESL) Rate (%)
Music Participation
Types (band, choir, orchestra, and each of the others)
Total Semesters (number)
School Engagement
School Attendance
Graduation Rates
Discipline Reports
Academic Achievement
Last Standardized Test Scores (State Assessments/ACT)
Grade Point Average (final)

Development of the Model

The theoretical construct that drives this study's model is based on research conducted by George D. Kuh and his associates on student engagement in higher education. Kuh posits that students who are engaged and who make connections with their academic institution experience more academic success (Kuh, 2001, 2003, 2005; Kuh, Kinzie, Schuh, Whitt & Associates, 2005). A study by Carini, Kuh, and Klein (2006) confirmed these linkages between student engagement and learning, particularly regarding the key skill of critical thinking. Further, they found that students who might be considered low ability (in this case, as defined by having low SAT scores) benefitted the most from being engaged in their institution. While Kuh's research has focused on students in higher education, their cogency for this study is evident. Participation in a music class, particularly at the secondary level where students often elect to

participate, requires institutional engagement. Like Kuh's work, this study seeks to elucidate some of the subtleties of the relationships surrounding student engagement, in this instance between the students, their participation in music, their engagement in their school, and their academic achievement.

The hypothetical construct that drives this model is based on the relationship of the five Latent Variables. Student Characteristics are hypothesized to influence School Characteristics, Music Participation, School Engagement, and Academic Achievement. School Characteristics, while hypothesized to be influenced by Student Characteristics, do not cause changes in Student Characteristics. They do, however, have theoretical effects on Music Participation, Student Engagement, and student Academic Achievements. Music Participation is thought to affect the way students engage in their school and have an effect on students' Academic Achievement. It is also theorized that if students are engaged in their school experience, engagement will have a substantial impact on the student's Academic Achievement. The theoretical model resulting from the aforementioned arguments is presented in Figure A-2 on the following page.

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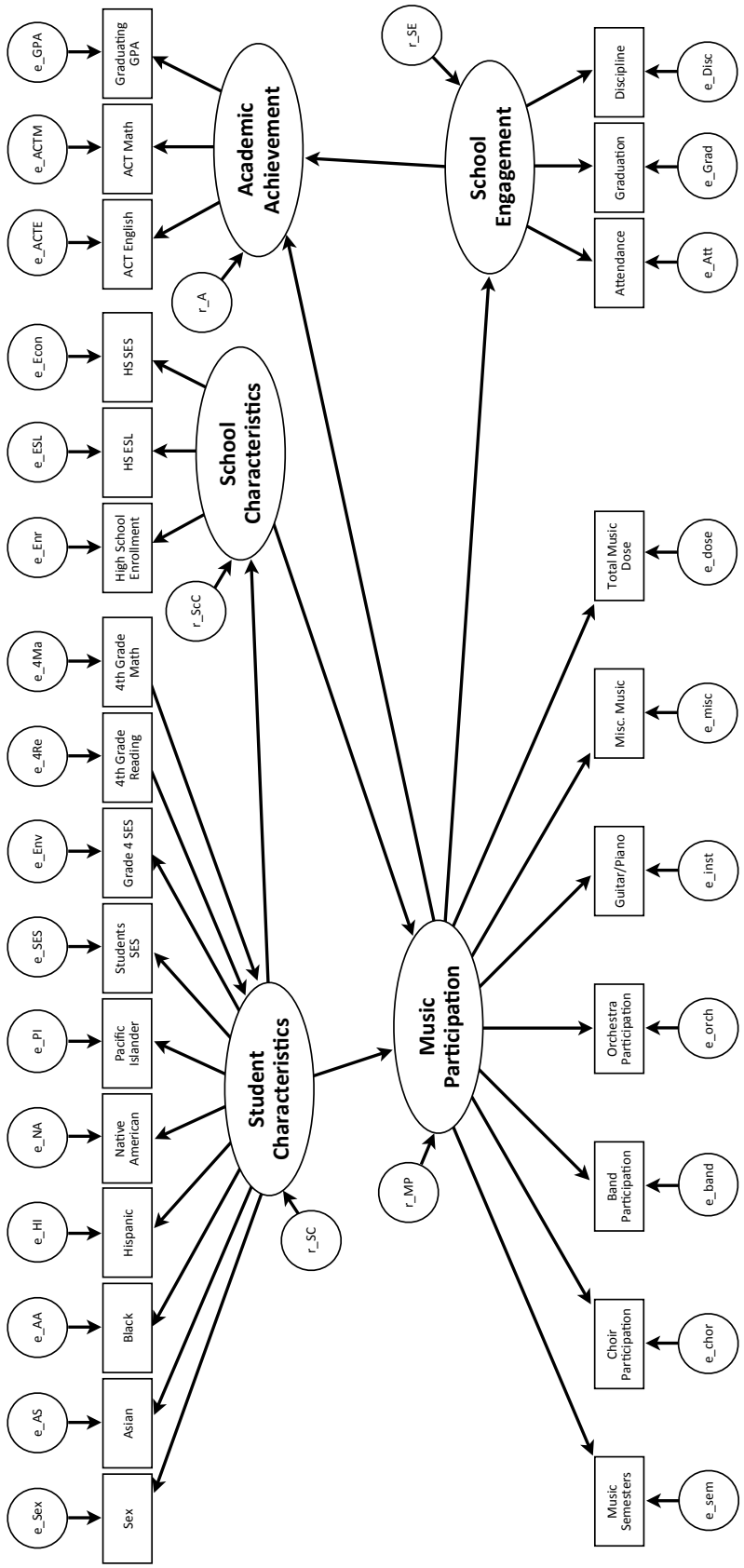

Figure A-2. Initial Model of the Estimated Impact of Music Program Participation on Students' Musical and School Engagement and Academic Success

The first step in this project was to create an original model based on previous literature and experience. The data were then obtained and scrubbed. Following this step, the data were subjected to SEM procedures and the model was adjusted until a satisfactory model was obtained. Multiple iterations of the base model were created in order to find a model that met the general criteria for fit within Structural Equation Modeling Standards (Kline, 2011; Little, 2013). This process involved removing variables that too closely covaried with other measures. Also, dichotomous demographic variables were removed, as they did not prove enlightening or help the model in terms of fit. Finally, the latent variable of School Characteristics was determined not to be a separate construct from Student Characteristics, and was removed from the model.

All student records for the 2012 school year were used in the analysis. When these data were compared with those from the 2008 set, there were—as expected—missing data for students who moved into and out of the district in the intervening years. AMOS (v. 20.0), the SPSS program used solely for SEM analysis, used FIML (full information maximum likelihood) techniques for all missing scores. FIML is generally the most accepted methodology for addressing missing data in SEM (Enders & Bandalos, 2001; Raykov, 2005), and the default method in AMOS. Though there is not an established "gold standard" for fit indices, there are some generally accepted threshold points that have been deemed acceptable by the field. This study had a model of fit approaching all standards. The Chi Square was significant (X^2 (61) = 3,077.84, $p < .001$). Though not desirable, this result was inevitable. The Chi Square is sensitive to *N*; with 6,006 subjects, a nonsignificant Chi Square was virtually impossible. The other measure of fit examined was a Root Mean Square Error of Approximation (RSMEA), which in this case was .088. This resulting number is between .100, a point at which models come under great scrutiny, and .080, which would be the ideal threshold. This less than optimal level of RSMEA fit may well have also been caused by the extremely large *N* included in the model.

Though RSMEA itself is not sensitive to *N* in the same way as the Chi Square statistic, RSMEA does diminish its correction for parsimony in models as *N* increases. The last measure of fit for the model is the Comparative Fit Index (CFI), which was .806. An appropriate threshold for the CFI has been the topic of some discussion (Fan & Sivo, 2005; Hu & Bentler, 1999; Yuan, 2005), and many researchers prefer a CFI exceeding .900. However, a score of .806 can still be considered acceptable. Indices that reflected a more solid fit would have been preferable. However, as is often the case with data sets such as these, when one gets a large *N* from the field, one also encounters more incomplete student records. Therefore, a cleaner fit is unlikely unless we start eliminating incomplete cases. Such a choice, however, would eliminate students who are subject to mobility issues from inclusion in the analysis. As it was important for us to include as many students as possible, we decided to include everyone in the analysis, even with the resulting moderate level of fit.

It should be noted that all fit measurements were completed without covariate indicators in the model. This is standard procedure, and those indicators were reinserted for all regression estimations. The final model, with standardized estimations, is illustrated in Figure A-3, on the following page.

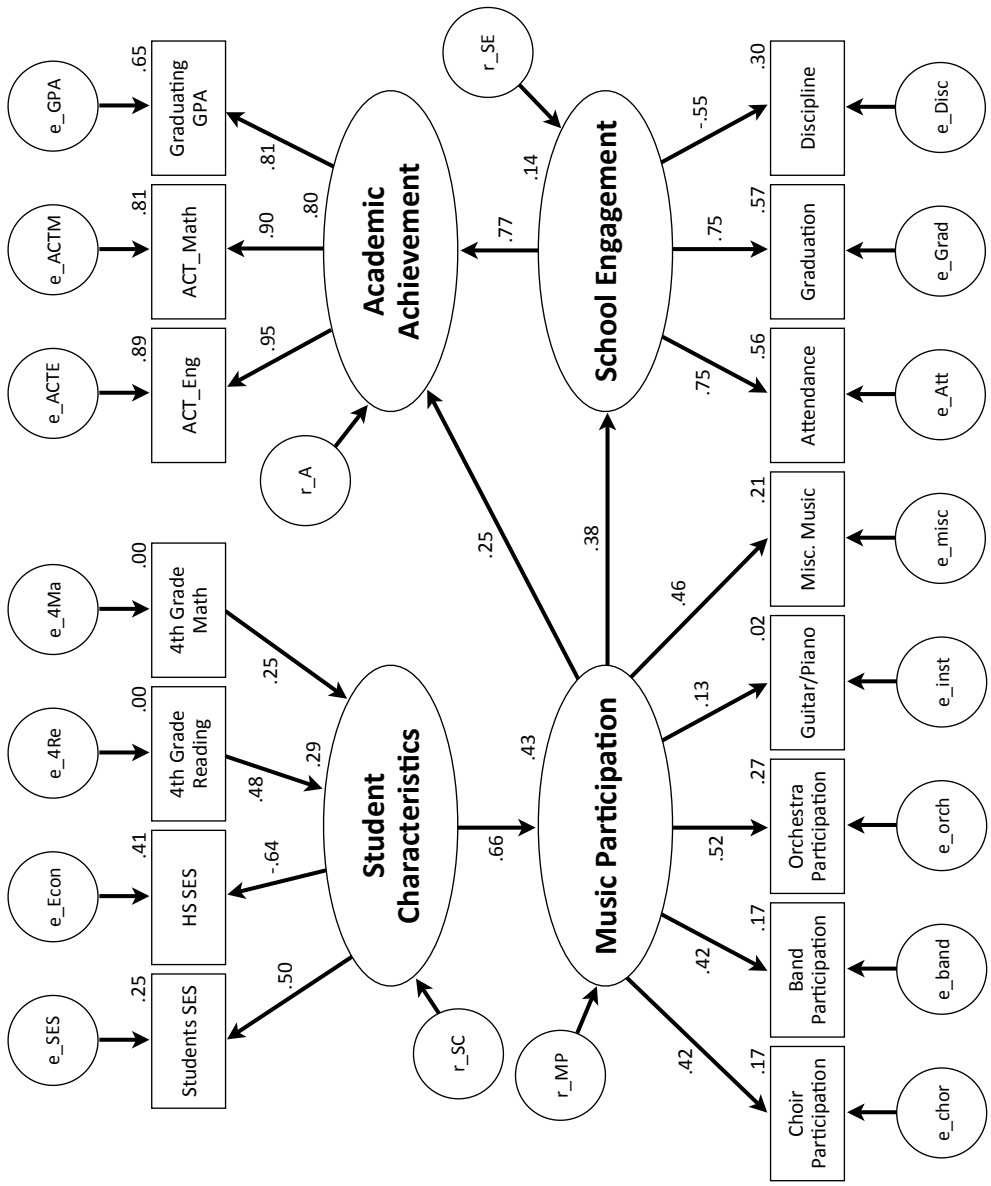

Figure A-3. Resultant Model of the Estimated Impact of Music Program Participation on Students' Musical and School Engagement and Academic Success with Standardized Regression Weights

Squared multiple correlations can be seen next to each observed indicators and latent variables in Figure A-4. This squared multiple correlation coefficient is the estimate of what percentage of the variable's variance is explained by the predictors in the model. For instance, it is estimated that the predictors in the model for Graduating GPA explain 65 percent of the GPA variance. The error variance of Graduating GPA is approximately 35 percent of the variance of Graduating GPA itself. All of these correlations are also presented in Figure A-5. It should be noted that, as the 4th grade standardized tests were used as covariates to the latent variable Student Characteristics, they have no measureable squared multiple correlation.

In examining the indicators of Student Characteristics, it is interesting to note that much more of the High School SES variability is accounted for in the model than each individual's SES variability. The variability for the participation time for each area of music study was somewhat matched across discipline, with the notable exception that more of the variability was accounted for in the area of orchestra participation, and almost no variability was accounted for with regard to class guitar and piano. Indicators for School Engagement had much of their variances accounted for in the model (.300 - .566), and even more variance was accounted for with regard to the indicators of Academic Achievement (.649 - .895).

All nineteen Regression Estimates in Figure A-5 are significant at $p < .001$. Regression estimates mean that when the variable at the tail of the arrow goes up one standard deviation, the variable at the head of the arrow is expected to go up by the regression estimate proportion of its standard deviation. For example, in this model, when Student Characteristic goes up one standard deviation, Music Participation goes up by 0.656 standard deviations. In SEM, latent variable regression estimates of less than 0.200 are usually not highly regarded, but estimates greater than or equal to 0.200 are considered to be important. All direct Standardized Regression Estimates are also presented in Table A-4 on the next page.

Student Characteristics were predicted by 4th grade standardized test scores. It is interesting to note that reading scores had an estimated influence roughly twice as high as math scores. These characteristics were reflected by two variables related to SES level as measured by free/reduced lunch data. Student individual data had an estimate of .50, which is very high. High School SES was based on the percentage of students on free/reduced lunch at the school where the student attends. Therefore, a negative estimate was expected. These four indicators accounted for 29% of the variance noted in the latent variable Student Characteristics.

Music Participation was reflected by five indicators. Participation in these activities was measured in semesters of enrollment. No further measure was generated, so while quality of instruction or performance has been noted to have an effect in past investigations (Johnson & Memmott, 2006), that aspect of the educational experience was not included in this model. The indicator titled Miscellaneous Music was the District's catch-all for general music classes, music appreciation, AP Theory, and so on. Clearly this indicator encompassed a wide range of student expertise—from music novices to potential music majors. The class guitar and class piano indicator had an estimate that was the lowest in the entire model, and perhaps should not garner any extended attention, except in how it interrelates to the other classes. All of the other four indicators had consequential estimates, and accounted for 43% of the variance noted in the Music Participation variable.

The latent variable of School Engagement was composed of three variables. Discipline reflected the number of discipline reports filed on each student. Therefore, a negative estimate was expected. The indicator Graduation included all data on whether each student graduated from high school on time, graduated late, dropped out or withdrew from school prior to graduating,

or transferred. Transfer students were entered as missing data when no more data on the student's disposition were available in the records. Attendance data were simply a percentage of days that the student attended school. All three indicators had consequential estimates. Fourteen percent of the School Engagement variance was accounted for in this model.

Academic Achievement was created from data from three indicators. In Metro Schools, all students take the ACT as their 12th grade state assessment. The English and Mathematics scores from that examination served as two of the academic indicators in this project. Both had a very high estimate. The third indicator was student cumulative grade point average. That variable also had a very high loading. Eighty percent of the variance for Academic Achievement was accounted for in this model.

The Regression Estimates for the Latent Variables was a key focus in this project. All four paths tested in this model had important estimation figures. Student Characteristics clearly have a strong relationship (0.656) to Music Participation. On the other side of the model, School Engagement to Academic Achievement had an even higher Regression Estimate of 0.767. However, the primary focus of this investigation was in Music Participation. In this model, estimates indicate that if Music Participation increases by one standard deviation, then School Engagement would be expected to go up 0.379 standard deviations, and Academic Achievement would also increase by 0.252 standard deviations. Further, the indirect effect calculated for Music Participation mediated by School Engagement for Academic Achievement resulted in an Indirect Effect of 0.293. The researchers consider all three of these estimates to be significant.

Figure A-4. Squared Multiple Correlations all Variables in the Model

Variable	Estimate
4th Grade Math	.000
4th Grade English	.000
Student Characteristics	.289
Music Participation	.430
School Engagement	.144
Academics	.798
Attendance	.564
Graduation	.566
Discipline	.300
Semesters of Music	.214
Semesters of Guitar/Piano	.018
Semesters of Orchestra	.273
Semesters of Band	.173
Semesters of Choir	.174
12th Grade GPA	.649
ACT Math	.811
ACT English	.895
High School SES	.408
Student SES	.253

Figure A-5. Standardized Regression Weights for all Variables in the Model

Variable	Effect	Variable	Estimate
4th Grade Reading	----->	Student Characteristic	.478
4th Grade Math	----->	Student Characteristic	.246
Student Characteristic	----->	Music Participation	.656
Music Participation	----->	School Engagement	.379
Music Participation	----->	Academics	.252
School Engagement	----->	Academics	.767
Music Participation	----->	Semesters of Orchestra	.523
Music Participation	----->	Semesters of Band	.416
Music Participation	----->	Semesters of Guitar/Piano	.133
Music Participation	----->	Semesters of Music	.463
Music Participation	----->	Semesters of Choir	.417
School Engagement	----->	Attendance	.751
School Engagement	----->	Graduation	.752
School Engagement	----->	Discipline	-.547
Student Characteristic	----->	Student SES	.503
Student Characteristic	----->	High School SES	-.639
Academics	----->	ACT English	.946
Academics	----->	ACT Math	.901
Academics	----->	12th Grade GPA	.806

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Appendix B | Music Student Survey Items

The student surveys were administered online four separate times. The rating scale questions (1–6) were repeated each time, while the additional open-response items varied each week, as presented below and on the next page. The 5-point rating scale was weighted as follows: Wonderful = 5 through Awful = 1; and Strongly Agree = 5 through Strongly Disagree = 1.

1. What is your username? [open response]

2. How was your last week at school?
   - ❍ Wonderful
   - ❍ Good
   - ❍ Okay
   - ❍ Bad
   - ❍ Awful

3. I think I will do well in school this year.
   - ❍ Strongly Agree
   - ❍ Agree
   - ❍ Not Really Sure
   - ❍ Disagree
   - ❍ Strongly Disagree

4. I am confident that I will graduate high school.
   - ❍ Strongly Agree
   - ❍ Agree
   - ❍ Not Really Sure
   - ❍ Disagree
   - ❍ Strongly Disagree

5. I am more likely to come to school knowing that I will get to go to music class.
   - ❍ Strongly Agree
   - ❍ Agree
   - ❍ Not Really Sure
   - ❍ Disagree
   - ❍ Strongly Disagree

6. I feel like music class helps me in other areas of school.
   - ❍ Strongly Agree
   - ❍ Agree
   - ❍ Not Really Sure
   - ❍ Disagree
   - ❍ Strongly Disagree

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Survey 1 Open-Response Items

7. Describe how you feel after you've just been to music class.
8. What do you take away from music class?
9. What do you enjoy the most about music class?

Survey 2 Open-Response Items

7. What are some things you've learned in music class that have helped you in other classes or subjects?
8. Tell us about a time that you were incredibly proud of something you accomplished in music class.
9. What is something that you would change about your music class(es)?

Survey 3 Open-Response Items

7. What other activities are you involved in outside of music? (i.e. sports, clubs, volunteer work, church, etc.)
8. You meet someone who doesn't go to your school and they want to know about you and what you like to do. What do you tell them about you and the things you like to do?
9. Do you feel like your music classes at school relate to the rest of your life? If so, how?
10. Do you take private music lessons outside of school? If so, what?

Survey 4 Open-Response Items

7. Are you planning on participating in any music-based activities this summer? If so, what?
8. Are you planning on taking any music classes at school next Fall? If so, what?
9. As you think about the past year, how do you think participating in music classes has affected your life at school (in terms of grades, motivation to come to school, and so on)?

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Appendix C | Music Student Focus Group Protocol

Introduction:

- We are researchers from the University of Kansas.
- We are here to talk about music in the Nashville Schools.
- We don't work for Nashville Schools, and your answers won't affect us in any way.
- Ground Rules: Take turns talking, don't interrupt each other (so that we can hear everyone), everyone should try and talk, what you say won't get back to your teachers or to anyone else, be respectful of each other.

1. Participation:

- What music classes do you participate in?
- What else do you participate in (sports, drama, etc.) through school?

2. Motivation/Engagement:

- Are your friends also in music?
- What gets you out of bed in the morning when you don't really want to go?
- Do you ever go to school because you get to go to music class when you otherwise may have not?
- What type of influence does participation in music have on your participation in school?

3. Identification:

- You meet someone who doesn't go to your school and they want to know about you and what you like to do. What do you tell them about you and the things you like to do?
- (For kids who are participating in hip-hop, mariachi. Get to cultural relevance.) How did you decide to take hip-hop (mariachi, world percussion)? What do you like about it? Why?
- Does being in this class relate to things that are going on in your life?
- Is what is going on in here relevant to you?

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Appendix D | Music Makes Us Contemporary Music Classes 2012-13

Country/Bluegrass

McGavock Cluster:
Dupont Hadley Middle School, Donelson Middle School, McGavock High School

Hip Hop

Big Picture High School

Isaiah T. Creswell Middle School Arts Magnet

Mariachi

Glencliff Cluster:
Wright Middle School, Glencliff High School

Rock Band

Hillwood Cluster:
J. T. Moore Middle School, Bellevue Middle School, Hillwood High School

Songwriting

Pearl Cohn Entertainment Magnet High School

World Percussion

Overton Cluster:
McMurray Middle School, Overton High School

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Parent, Metro Nashville Public Schools

Lonnell Matthews
Metro City Council

Nina Miller
AC Entertainment

Ted Murcray, Ed.D.
Executive Principal, Isaiah T. Creswell Middle Arts Magnet

Jesse B. Register, Ed.D.
Director of Schools, Metropolitan Nashville Public Schools

Paula Roberts
Former Executive Director, National Museum of African American Music

Debbie Schwartz Linn
Executive Director, Leadership Music

Matt Seaton
Former Community Outreach Manager, Country Music Association

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Senior Vice President, Member Services, The Recording Academy®

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President & CEO, Nashville Convention & Visitors Corporation

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Demetrus Stewart
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Gregory Stewart, Ed.D.
Executive Principal, Nashville School of the Arts

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Laurie T. Schell
Director, Music Makes Us
Metropolitan Nashville Public Schools

Nola Jones, D.M.A.
Coordinator, Visual and Performing Arts
Metropolitan Nashville Public Schools

Valerie Harbin
Senior Secretary
Metropolitan Nashville Public Schools

University of Kansas Staff

Jenny E. Memmott
Research Analyst, Center for Public Partnerships & Research
University of Kansas

Brittany M. Stewart
Graduate Research Assistant, Center for Public Partnerships & Research
University of Kansas

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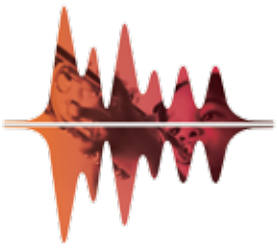

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2601 Bransford Avenue • Nashville, TN 37204
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