

Music Learning Networks: Supporting the Music Learning of Adolescents

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Abstract

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The ways young musicians engage with and learn music are evolving. Technological advances, changes in the nature of schooling, the developing music landscape, shifting availability of formal and virtual learning opportunities, and the increasingly diverse group of young musicians engaging with music today are all drivers of this evolution. To better understand how young people learn music of personal significance, I adapted elements from ecological, multicultural, and social network related theories of learning in order to develop a network theory of music learning. Using this framework, I conducted a mixed methods study in a large city in the northeastern United States. Three hundred and forty-seven students in four sites completed surveys; eleven students from one site participated in focus groups.

A key feature of this analysis is a substantial focus on the music learning opportunities and outcomes of low-income and otherwise marginalized students. Relatively few studies have explored the music learning and engagement of these populations. The research that has been done indicates that gaps exist in music learning opportunities and outcomes by race/ethnicity, socioeconomic status, and school characteristics.

I find that adolescent musicians navigate in and across multiple settings—formal, informal, and virtual—and form learning relationships with peers, teachers, and family members as they pursue their musical goals. Different settings and supporters can offer distinct kinds of support to learners, who actively make decisions about which settings and supporters to engage with. I show that the peer learning networks students form are systematically related to their music learning outcomes. The quality of the music learning environments students engage in and the degree of alignment between their musical interests and the environments in which they participate are on average positively and significantly related to learning outcomes. On average, low-SES students participate in music learning environments less frequently than high-SES students. They also participate in lower-quality environments. I advance a model of music learning and provide recommendations for learners, supporters, administrators, and policy makers to support the music learning of young people that promote equity and cultural recognition.

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Chapter 1: Description of the Research Problem and Review of the Literature

Introduction and Statement of the Research Problem

Every day in the United States, scores of teenage musicians are engaged in the pursuit of their musical dreams. These dreams include studying music in college, forming a band and performing, becoming a professional musician, and entering the music business world. Some young people have more modest musical goals—learning to strum a few chords on guitar, singing in an amateur chorus, or writing their own song. These young musicians hail from different racial, ethnic, and cultural backgrounds. They live in different neighborhoods and come from a range of socioeconomic strata. They circulate in and through multiple learning environments—both formal and informal—in school, outside of school, at home, taking private lessons, surfing the Internet, as well as other settings. Students learn from teachers, peers, and family members, and they draw on their own interests and knowledge as they engage musically with the world around them.

How do adolescent musicians successfully navigate these different learning environments and relationships to learn the music they care most about? What can be done to support learning, especially by low-income and otherwise marginalized students whose educational opportunities are frequently less rich than their more affluent peers? Based on my reading of the research literature, music learning of personal significance to adolescents, particularly students from low-income and marginalized backgrounds, is understudied. While student-led musical engagement may be the predominant form of musical activity, particularly among adolescents, the music education research community still has much to learn about student-driven music learning.

Independent strands of research from multiple fields—music education, the learning sciences, multicultural music education, and community music—have shed light on key facets of student-driven music learning among teenagers. A key purpose of this chapter is to review these substantive literatures with four primary goals in mind: 1) to form a picture of what we know and what we do not know about the phenomenon of music learning among teenage musicians in the United States, 2) to examine the extant literature in music education that focuses on music learning among low-income or otherwise marginalized students, 3) to probe the gaps in our knowledge, and 4) to advance theory and empirical research to better understand and support the music learning of adolescent musicians.

Research has shown that adolescent musicians learn music of personal significance, which often though not always includes popular music, in and across a range of settings—formal and informal (McPherson & Hendricks, 2010a; Higgins, 2012; Green, 2002). Student interest, motivation, and identity have been identified as key predictors of successful music learning (MacDonald, Hargreaves & Miell, 2002). Development of identity in and through music, and the relationships between identity and learning, have been shown to be particularly prominent during adolescence (Tarrant, North, & Hargreaves, 2002). Cultural patterns of musical participation and engagement, and the social connections with peers that often form the nucleus of this participation, can be considered to be both outcomes of learning and the structures through which it takes place. (Bell, Lewenstein, Shouse, & Feder, 2009; Campbell, 1991). I believe there is opportunity to integrate interpersonal, intrapersonal, contextual, and cultural ingredients of the music learning process to create a more representative picture of the way adolescent musicians learn music of personal significance. Empirical research drawing on an integrated and

representative theoretical framework may produce new insights to promote student learning and educational equity.

Ecological and ecologically minded theories of learning emphasize the collective importance of place and intrapsychological phenomena such as interests, motives, knowledge, and culture in learning (Bell et al., 2009). Bell, Tzou, Brickner and Baines (2013) argue that ecological approaches to the study of learning are well suited to account for the “how, why and where people learn in relation to constructs of human difference—race, class, disability, etc.” (p. 269). An ecological conception of the music learning process would incorporate many of the elements that have already been shown independently to be related to learning outcomes, but such a conception is both undertheorized and under-applied as part of a program of empirical research in music education. Adapting ecological learning theory can potentially help researchers and supporters of young musicians better understand the phenomenon of student-driven music learning and facilitate that learning.

Understanding and addressing inequalities in music learning opportunities and outcomes go hand in hand with understanding the phenomenon of music learning itself if we hope to promote equity in music education. National statistical data, and a collection of more targeted studies, demonstrate that on average there are fewer structured music (and arts) learning opportunities for lower-income and racial/ethnic minority learners than for their more affluent peers (Parsad, Spiegelman & Coopersmith, 2012). Evidence suggests that there are differential levels of participation in existing music programs, with high-SES students participating more, on average, than low-SES students (Catterall, 2009). Further, research has shown that the quality of music and arts education programs in the United States can be low. According to Seidel, Tishman, Winner, Hetland, and Palmer (2009), “Many children in the United States have little or

no opportunity for formal arts instruction, and access to arts learning experiences remains a critical national challenge. In addition, the quality of arts learning opportunities that are available to young people is a serious concern” (p. v).

National assessments of music knowledge and skills reveal achievement gaps in eighth-grade students’ ability to respond to music. Students from low-income families, on average, score lower on assessments than students from families with higher incomes (U.S. Department of Education, 2009). Black and Latino students had lower scores on the assessment than their White and Asian peers. Further, ethnomusicological research by Campbell (2005) indicates that the types of music taught in formal educational environments may not be representative of the music valued by students from diverse cultural backgrounds. Research in ethnomusicology indicates that patterns of musical participation and engagement often favored by adolescents—including low-income and racial/ethnic minority students—may be undersupported and undervalued in many school and formal learning environments (Butler, Lind & McKoy, 2007). As a result, students’ learning experiences may be less frequent and less deep than they would have been if they had been engaging in more supportive environments that were more aligned with their interests. Better understanding patterns of musical participation and engagement among teenage musicians as they pursue music learning of personal significance to them—and broadening research to include low-income and racial/ethnic minority learners—will advance efforts to promote equity and help to maximize learning for all students.

I used a mixed methods research design, including social network analysis techniques, and built upon ecological theories of learning and prior music education research to explore the relationships young musicians form with those who support their learning: teachers, peers, family members, and others. I also examined the multiple settings, both formal and informal, in

which young musicians engage in music making and music learning. I developed the music learning network framework—interconnected learning relationships among learners and those who support them, as well as the constellation of settings in and across which learning takes place. The concept of a music learning network and its relation to learning outcomes of personal significance to students are the fundamental foci of this thesis. I address four research questions in my study:

1. What are the most helpful relationships, settings, and resources that constitute a music learning network?
2. Do students with richer connections to people, settings, and resources in a music learning network exhibit more positive learning outcomes on average than those without these connections? If so, which relationships, settings, and resources are most strongly associated with higher levels of music learning?
3. Do students whose interests, motivations, and goals are aligned with the resources available to them in their learning network exhibit more positive music learning outcomes than students whose interests and motivations are out of alignment with resources available to them?
4. Are the music learning networks and music learning outcomes of low-SES students different on average from those of high-SES students, and if so, in what ways?

Music Education: Knowledge, Skills, and Participation

Policy Context. There is general consensus in the literature that music education in schools—as well as arts education more broadly—has been on the margins of educational practice, research, and policy efforts (Greene, 1995). In a research report published by Harvard Project Zero that focused on the quality of arts learning across a range of arts domains, Seidel et

al. (2009) assert, “The infrastructure for in-school arts learning opportunities in the U.S. has been seriously weakened over the past century” (p. 6). The focus on “core” academic subjects such as math and science contributed to a shift of resources and attention away from in-school music instruction (Mark, 2008; Seidel et al., 2009). Seidel et al. (2009) also note that the trend towards devaluing music and arts was briefly reduced with the Goals 2000: Educate America Act of 1994. This act established arts (including music) as a required in-school subject. Though the subsequent No Child Left Behind Act of 2001 (NCLB) included the arts (the term *arts* includes music in the NCLB language) as a core subject, the current climate of performance-based accountability in public schools has largely emphasized student achievement in areas such as reading or math at the expense of music and art. As a result, NCLB may not have helped in-school music (Seidel et al., 2009). While there are many current indications that in-school music learning opportunities are limited, researchers have also noted that informal learning opportunities—less explored overall in the literature—hold strong potential to support the music learning of youth (Green, 2002; Seidel et al., 2009).

Music Learning and Participation. Several studies in which researchers analyzed national datasets have shed light on some of the general features of music education and participation in the United States, particularly in K-12 schools. The National Assessment of Educational Progress Arts Assessment (NAEP) (U.S. Department of Education, 2009) is the only national-level assessment of music skills and knowledge in the United States that I have identified. The NAEP music assessment has been administered on four occasions: 1972, 1978, 1997, and most recently in 2008. The next test is scheduled for 2016 (National Center for Education Statistics, 1999; U.S. Department of Education, 2009). The assessment framework

that directly informed the creation of NAEP assessment emphasizes four dimensions of music learning. The fourth dimension was added in 2014.

- 1) *Creating*—imagining and making of music.
- 2) *Performing*—selection, rehearsal, and presentation of music.
- 3) *Responding*—analysis, interpretation, and evaluation of music.
- 4) *Connecting*—relating personal experience and knowledge to music.

(U.S. Department of Education, 2008)

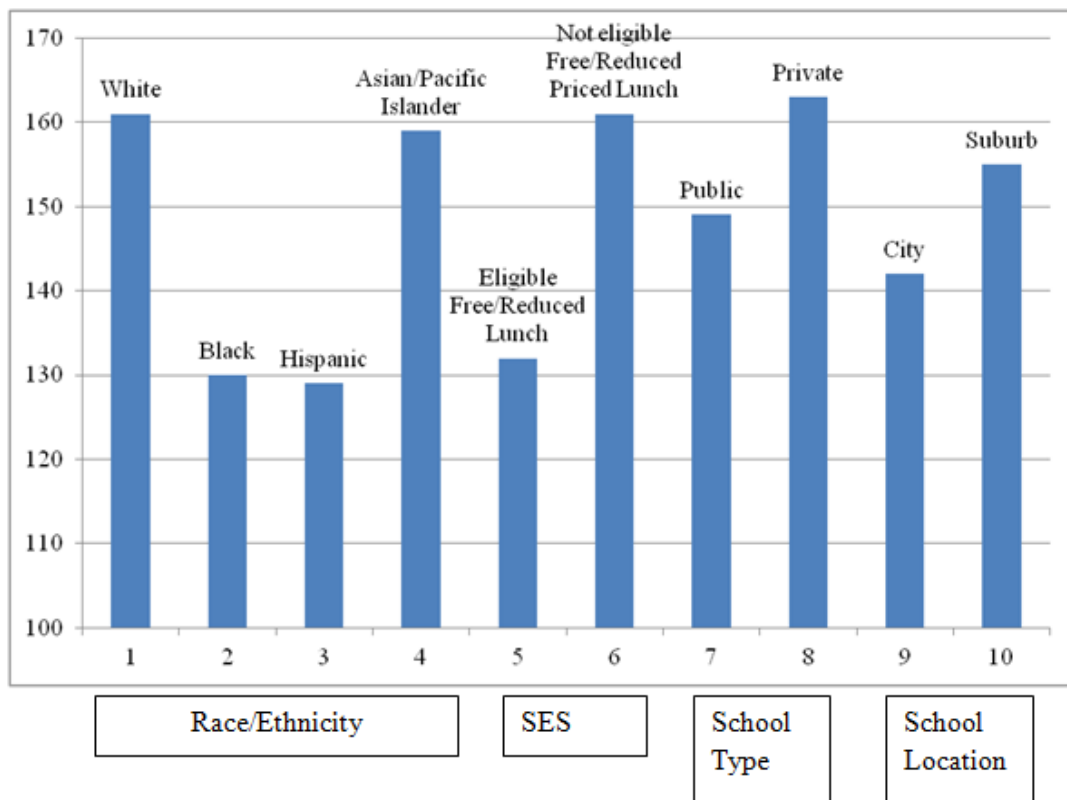
The 2008 version of NAEP was a paper and pencil test that was designed to measure a national sample of eighth-grade students' abilities to analyze, interpret, and evaluate music. The 2008 Arts Report Card (U.S. Department of Education, 2009) stated that in order to assess students' abilities to respond to music, they were asked to “analyze and describe aspects of music they heard, critique instrumental and vocal performances, and demonstrate their knowledge of standard musical notation and music's role in society” (p.1). Due to budgetary constraints, only the responding dimension was assessed in 2008.

In the NAEP assessment, music responding skills and knowledge are measured on a scale ranging from 0 to 300. The scores are normally distributed with a mean score of 150 and a standard deviation of 35. Students whose test scores fell at different levels of the middle of the score distribution—between the 25th and 75th percentiles—were typically able to successfully answer the following questions correctly or earn partial credit: identify the type of instrumental ensemble performing an excerpt; identify the directional contour of a melodic phrase; and describe a feature of a song that identifies it as a spiritual. Students at different levels of the upper quartile of the score distribution could typically answer the following questions correctly or receive partial credit: identify the correct time signature for a piece of music; provide a limited

explanation of why spirituals were important in people’s lives; and provide a comparison between the tone color of two different singers.

The NAEP data show pronounced achievement gaps in music learning by race/ethnicity, SES, school type, school location, gender, and parental education level. Figure 1.1 illustrates learning gaps in music by race/ethnicity, SES as indicated by eligibility for free/reduced-price lunch, school type, and school location.

Figure 1.1. Mean Student Learning Levels in Music by Race/Ethnicity, SES as Indicated by Eligibility for Free/Reduced-Price Lunch, School Type, and School Location.



Data used to prepare this table were gathered from “2008 National Assessment of Educational Progress at Grade 8: Music & Visual Arts.” U.S. Department of Education, National Center for Education Statistics (2009).

Black students on average scored .89 standard deviations below their White peers on the music assessment, and the difference is statistically significant. Hispanic students on average scored .91

standard deviations below Whites. Neither the difference between White and Asian/ Pacific Islander music scores nor the differences between the Black and Hispanic scores are statistically significant. Students eligible for free or reduced-price lunch scored .83 standard deviations below their higher-SES peers. The gaps between school type—public or private—and school location—urban or rural—were smaller than the race/ethnicity and SES gaps but were nontrivial and statistically significant. Public school students scored on average .4 standard deviations below students who attended private school, and students in urban schools scored on average .37 standard deviations below students in suburban areas.

Three dimensions of music learning were assessed in 1997: creating, performing, and responding. Achievement gaps in responding ability were similar in type and magnitude to those reported in 2008. While data from 1997 assessments show that students' abilities to respond to music are correlated with their musical creation and performance abilities, gaps in achievement in creating and performing categories did not necessarily follow those observed for responding. For example, the performance of Black students matched or exceeded the performance of Whites students on select music performing and creating metrics.

While many mean test score differences for population subgroups surveyed in NAEP are statistically significant, they are calculated using a descriptive as opposed to an inferential statistical approach. It cannot be known from existing NAEP reports to what extent, if any, the Black-White music learning gap might be explained by other variables such as SES or parental education level. To my knowledge, inferential statistical analyses of the NAEP 2008 music data are rare.

Data are available from NAEP (U.S. Department of Education, 2009) documenting school-reported frequency of music instruction. According to these data, displayed in Table 1.1,

8 percent of eighth-grade students attended schools where no music instruction was offered; 84 percent of students attended schools in which music was offered between one and four times a week, with 57 percent attending schools reporting three or four music classes offered weekly.

Table 1.1. Percentage of Students Attending Schools with Different School-Reported Frequencies of Music Instruction.

Number of Weekly Music Classes	Percent of Students
0	8
<1	8
1 or 2	27
3 or 4	57

Data used to prepare this table were gathered from “2008 National Assessment of Educational Progress at Grade 8: Music & Visual Arts.” U.S. Department of Education, National Center for Education Statistics (2009).

According to the 2008 National Report Card in Music and Arts (U.S. Department of Education, 2009), the availability of music instruction in schools did not differ significantly by race/ethnicity, eligibility for free/reduced-price lunch, or gender. That is, according to the report, students from low-SES backgrounds were just as likely to be attending schools with high levels of music and arts instruction as their high-SES peers. This is a counterintuitive finding, particularly given the achievement gaps observed in music and arts learning. In fact, in a separate study conducted by the U.S. Department of Education that surveyed music and arts in elementary schools, it was reported that in school year 2009-2010, 97 percent of high-SES schools (defined in the study as schools in which 0-25 percent of students were eligible for free or reduced-price lunch) reported offering instruction specifically designed for music, while 89 percent of low-SES schools (defined in the study as schools in which 76 percent or more of students were eligible for

free or reduced-price lunch) reported offering instruction specifically designed for music (Parsad, Spiegelman, & Coopersmith, 2012).

Catterall (2009), using data from the National Educational Longitudinal Study of 1988 (NELS:88) finds the probability of high-SES quartile students being highly involved in the arts in school is 32 percent, whereas the probability of low-SES quartile students being highly involved is 18 percent. Catterall also found, within the lowest-SES quartile, that proportions of high levels of music and arts participation varied by race/ethnicity. Approximately 15 percent of low-SES Whites had high levels of music and arts participation, followed by 13 percent of Blacks, 8 percent of Hispanics, 12 percent of Native Americans, and 6 percent of Asian/Pacific Islanders. Catterall's analysis does not focus exclusively on music, but it is possible that broad contours of his findings for overall arts involvement (which include music participation) could resemble what one would find looking exclusively at music involvement.

In summary, recent education policies may have weakened music education in K-12 schools. National testing shows racial/ethnic and economic achievement gaps in music, with Black and Latino students doing less well on assessments than White and Asian students. Lower-SES students are also underperforming compared to higher-SES students. Research also indicates that there is differential access to and participation in music learning activities by race/ethnicity, SES, and other student characteristics. Racial/ethnic minority groups and lower-SES students tend to be participating less than Whites and students from higher-SES backgrounds. There also appears to be a substantial variation in program quality, with the overall quality of music and arts programs being lower for low-income and marginalized groups than for their more privileged peers.

Learning Sciences and Music Psychology: Identity, Interests, and Motivation

Research from the learning sciences and music psychology has helped to shed light on some of the intrapsychological elements of the music learning process. These elements include student interests, identity, and motivation, as well as metacognition, learning with understanding, and the influence of community and context.

Findings from music psychology research point to the value of students experiencing freedoms and developing capacities to articulate musical goals and to take control of their own process in achieving them (McPherson & McCormick, 2000; Green, 2002). Developmental approaches in music psychology have also yielded findings that may be instructive when considering music learning among high school-aged youth in particular. Heiner (2002) asserts that adolescence may be a particularly important time in the formation of young people's musical preferences and listening habits. He further states that habits formed in adolescence may persist in later years of life. Montgomery (1996) suggests that during adolescence, a preference for popular music often increases, while preferences for other forms of music—such as classical—decrease.

Hargreaves, Miell, and MacDonald (2002), adopting social-psychological and sociocultural approaches, advance the concept of musical identities, which they assert hold the potential to “explain some of the processes and mechanisms by which individuals monitor and conceptualize their own musical development” (p. 7). For these researchers, musical identity refers both to the roles individuals assume in musical settings—e.g., as composers and performers—and to the ways in which engagement with music may interact with broader components of personal identity, such as gender. O’Neill’s (2002) research indicates that learner self-perceptions are positively related to the development of music performance skills. Tarrant,

North, and Hargreaves (2002) adopt a social identity theory perspective and suggest that a major appeal of music to adolescents is that it may help them in forming positive social identities at both individual and group levels.

Student motivation has also been identified as an important driver and outcome of music learning. Renwick and Reeve (2012) review the music motivation literature and conclude that intrinsic motivation and student autonomy are important predictors of learning. They highlight the development of self-determination theory (Ryan & Deci, 2000) as a way to operationalize and understand student motivation and as a guide for empirical work. Self-determination theory asserts that intrinsic student motivation is an important driver of music learning.

The work of Gary McPherson (2000, 2010, & 2012) has drawn attention to the importance of concepts of motivation, self-regulation, and self-efficacy in the development of musical abilities. McPherson and McCormick (2000) studied the motivational factors of instrumental performance. They surveyed 349 instrumentalists between the ages of 9 and 18 immediately before and after these musicians took an instrumental performance examination in order to explore potential factors they believed might be associated with music performance. Using factor analysis and regression techniques, the researchers concluded that though technical and expressive skills played important roles, the ways that students thought about themselves, the task, and their performance were as predictive of performance as time spent practicing their instrument (McPherson et al., 2000).

Adapting Bandura's (1997) concept of self-efficacy—the conviction that one can successfully execute the behavior required to produce the outcomes—McCormick and McPherson (2003) used a structural equation modeling approach to investigate whether this concept is predictive of musical performance outcomes. These researchers concluded that self-

efficacy was the best predictor, among covariates in their models, of musical performance among a sample of 332 instrumentalists taking the Trinity College, London, performance examinations. They further concluded that the use of cognitive strategies used by instrumentalists, such as metacognition, were also positively associated with performance on the exam.

In a survey of 2,465 adolescents conducted in the United Kingdom to better understand the importance of music to adolescents in England, North, Hargreaves, and O'Neill (2000) found that more than 50 percent of respondents either currently played—or had played—a musical instrument and listened to music on average 2.5 hours a day. Popular music genres were significantly preferred by participants. Applying factor analysis techniques to the survey data, the researchers concluded that music is important to adolescents because it allows them to express themselves to the outside world and to satisfy their emotional needs (MacDonald, Hargreaves, & Miell, 2002).

Findings from the learning sciences are also relevant to those in the music education community. Bransford, Brown, and Cocking, in conjunction with the National Research Council (2000), conducted a study to synthesize the multiple and diverse findings emerging from the learning sciences and make them relevant to classroom practice. Bransford et al.'s report (2000) focused primarily on learning in formal settings. New research, also conducted through the National Research Council (Bell et al., 2009), suggests that many of the findings are also applicable in informal settings.

Four central concepts emerging from the learning sciences, described in Bransford et al.'s (2000) report, may be especially relevant to music learning contexts: 1) active learning and metacognition, 2) learners' pre-existing knowledge, 3) learning with understanding, and 4) community and context. I will briefly summarize each of these concepts below.

1. Active Learning and Metacognition. The report emphasized the importance of learners taking control of their own learning. Sometimes termed a metacognitive approach or active learning, this concept recognizes the importance of learners “defining learning goals and monitoring their progress in achieving them” (Bransford et al., 2009, p. 18).

2. Pre-existing Knowledge and Beliefs. According to the report, a strong finding across the literature is the importance of learners’ pre-existing knowledge and beliefs in the learning process and the importance of recognizing and engaging that knowledge in educational settings. The report also stated that student cultural differences may be reflected in the knowledge students bring to learning environments and may influence students’ levels of comfort working individually or in groups.

3. Learning with Understanding. There has been a recognition of the importance of learning with understanding. According to the NRC report, studies of expert thinking have helped to show that in addition to factual knowledge, learners are aided by the development of conceptual frameworks and the organization of knowledge in ways that allows them to successfully retrieve and apply it.

4. Context and Community. The report recognizes and emphasizes the importance of context in shaping the way learning takes place. Researchers contend that community-centered approaches in which learners are encouraged to work together in and across school and out-of-school settings hold potential for education.

Some of the implications of these findings for music learning are consonant with existing music-focused research findings that describe the value of students experiencing freedoms and developing capacities to articulate musical goals and to take control of their own process in

achieving them (McPherson & McCormick, 2000; Green, 2002). Further, music learning research describes the importance of valuing learners' musical tastes and cultures in supporting their learning (Anderson & Campbell, 2010), and the importance in music learning outside as well as inside school (Elliott, 2012).

Taken together, these findings help to bring into focus dimensions of music learning among high school-aged youth that may prove helpful in describing the nature of music learning and in thinking about ways to support it. Developmental approaches to the study of music suggest that adolescence may be a particularly important period in the development of musical preferences and listening habits and a time in which young people may favor informal as opposed to formal musical engagement. Developmental psychology has long pointed to adolescence as a period in which youth seek and form their identities (Erickson, 1968). Research also suggests that music identities may be a dimension through which music learning is mediated. The development of identity and musical identities are also viewed by some as outcomes of the music learning process. Student interest and motivation have been recognized to be central to learning. Findings from the learning sciences add to, and in many cases reinforce, findings from music-focused research.

Multicultural Music Education

Multicultural education scholars assert that effective teaching often requires that the teacher possess knowledge about the cultural contexts in which learning takes place (Banks, 1994; Ladson Billings, 1995). Research indicates that pre- and in-service music teachers often believe in the value of integrating music from different cultures into their teaching, but were not sure how to do so effectively (Butler, Lind, & McKoy, 2007; Norman, 1994; Young, 1996). Butler, Lind, and McKoy (2007) argue succinctly that “understanding how students' musical

experiences are mediated by culture is critical for educators interested in maximizing student learning” (p. 245). Abril (2006) conducted a randomized experiment contrasting the learning impacts of two different multicultural education teaching approaches on student learning. While the results of the experiment were mixed, some evidence indicated that different pedagogical approaches were related to small differences in specific learning outcomes for youth. Abril (2006) recommended additional research focused on learning outcomes, contending that the majority of research to date in multicultural music education has focused on student musical taste and preferences.

Ethnomusicological research has helped to document the ways in which culture interacts with learning and teaching processes in music (Nettl, 2012; Campbell & Shippers, 2012). Describing and documenting various approaches to music teaching and learning within and across cultures—making them visible—has been one focus of researchers in the field of ethnomusicology. Campbell (1991) has researched multiple ways that teaching and learning music take place, and how teaching practices and student approaches to learning vary across settings, cultures, and musical genres. Research in ethnomusicology has also drawn attention to power relationships among and between teachers, students, and musical styles as they relate to the teaching and learning process (Campbell, 2012). Schippers (2010), working from an ethnomusicological perspective, advanced a descriptive model he contends can be useful in grouping and understanding music learning and teaching approaches across cultures. Schippers’ research led to his creation of a descriptive framework of musical transmission that contains a descriptive typology of the contextual, pedagogical, and interactive dimensions of music teaching and learning (Schippers, 2010). This framework also incorporates a dimension of cultural diversity.

Some scholars have advocated for the modification of music learning environments in ways that make them more accessible to learners from diverse backgrounds and that draw upon the cultural assets of learners to support music learning. Anderson and Campbell (2010) provide a rationale for the adaptation of multicultural education practices to music learning settings that is based upon four key claims:

1. The utilization of multiple forms of musical content as well as pedagogical approaches exposes learners to a wider variety of musical experiences, making them more receptive to multiple forms of music expression.
2. Learners recognize that multiple forms of music expression around the world are as sophisticated as their own.
3. Learners are able to learn many equally valid ways of creating music.
4. Through the study of multiple forms of music, learners can become develop greater musical flexibility.

In addition to pedagogical approaches, curriculum content is also intertwined with educational equity. To the degree that music and arts curricula do align with and build upon the cultural identities and backgrounds of students, it is possible that the learning experiences of these students may be less frequent, satisfying, and deep than they would be with more culturally relevant curricula. Butler, Lind, and McKoy (2007) report that studies investigating multicultural music education programs in schools have found curricula to be inadequate, with little attention given to cultural context or authenticity. Campbell et al. (2005) have also explored diversity issues in music education, such as the inclusion of music from racial and ethnic minority students in school curricula.

Banks et al. (2007) write, “Being born into a racial majority group with high levels of economic and social resources—or into a group that has historically been marginalized with low levels of economic and social resources—results in very different lived experiences that include unequal learning opportunities, challenges, and potential risks for learning and development” (p. 15). Banks (2010) further asserts multicultural education as a field holds central the notion that all students—from diverse socioeconomic, racial/ethnic, and cultural backgrounds—should have an equal opportunity to learn in school. These fundamental notions also apply in music education. While a base of empirical work linking multicultural education approaches in music to musical outcomes for students may be nascent, some music education scholars also argue that multicultural approaches to music education have the potential to support the learning of racial/ethnic minority students (Anderson et al., 2010; Butler et al., 2007; Abril, 2006). Music education and ethnomusicological research has at times been directly and explicitly linked to multicultural education theory (Campbell, 2012), but based on my reading of these literatures, this kind of work is rare.

Learning Environments: Formal, Informal, and Virtual

Adolescents engage and learn musically in and across a range of settings. Different settings, research suggests, may have different affordances for learners. Formal in-school learning may offer music students opportunities to learn specialized skills, such as learning to read music notation, which may be harder to acquire in non-formal settings. Non-formal settings may at times be better suited for the kinds of experimentation, flexible engagement, and collaboration that can characterize ways adolescent musicians learn music they care about. The alignment (or misalignment) of student interest, motivation, and patterns of musical engagement with the pedagogical approaches and curricular content found in the learning environments

available to them may in part determine whether students choose to engage in these environments. The availability, accessibility, quality, and cultural relevance of music learning environments may all factor into levels of student participation and engagement in these environments.

The importance of non-formal environments for adolescents engaged in music and arts learning has been documented extensively in the literature (Seidel et al., 2009; Parsad et al., 2012). McPherson et al. (2010a) found, based on a sample of 3,037 students in four high schools and four middle schools, that U.S. adolescents engage in music learning inside and outside of school. According to the study, student interest in music as an in-school subject ranks at the bottom of a list of core academic subjects across three grade groups—sixth grade, seventh through ninth grades, and twelfth grade. Further, this research indicates that students' perceptions of their self-competence in music also ranked (with art) at the bottom of a list of content areas that included mathematics, science, physical education, and mother tongue or language arts instruction. When asked about their interest in the same subjects outside of school, music was near or at the top of the list—second to sports for grade groups six and seven through nine in the study and top of the list for grades ten through twelve. Seidel et al. (2009) contend that the devaluing of music and arts in schools has placed an added emphasis on understanding and supporting the way that music and arts learning takes place outside of school. Tarrant et al. (2002) state that a preference for out-of-school music learning becomes particularly pronounced during adolescence as “adolescents begin to devalue school-organized music, and instead favor musical activities they can organize themselves” (p. 134).

A U.S. Department of Education study, drawing from a national survey of primary and secondary schools, reported that 44 percent of secondary schools engaged in partnerships with

cultural or community organizations, 37 percent partnered with individual artists or craftspeople, 33 percent partnered with colleges and universities, and 28 percent partnered with performing arts centers in the facilitation of music and arts learning (Parsad et al., 2012). These data—though drawn from a study focused on school-based music and arts learning—emphasize the frequency with which K-12 schools are tapping into community arts resources.

Emergent themes from community music—a newer subfield within music education—include a recognition of the importance of diverse settings in which music learning takes place (Elliott, 2012; Higgins, 2012). Higgins (2012) describes the existence of multiple forms of communities—local, global, and virtual—and claims that diversity and accessibility across this range of settings are key concerns. A theme in the community music literature, which is congruent with themes in other education research camps, is that students navigate multiple learning environments—formal and informal, with different patterns of participation and affordances of particular settings—and learning can be best supported when student motivations and interests align with multiple sets of resources in and across settings (Bell et al., 2009; Jones & Langston, 2012). Higgins (2012) asserts that community music is concerned with creating accessible and diverse music-making opportunities across a range of settings. Jones et al. (2012), referencing social capital theory (Bourdieu, 1986), argue that educators in both formal and informal settings can foster the development of students’ social capital (this would presumably include music learning and performance ability) by connecting students to multiple existing music learning opportunities in the community, creating new music learning opportunities, and helping students develop the expertise to navigate multiple learning environments and organize their own musical experiences.

In 2012 (Linsin, 2012a) I conducted a qualitative study that examined the musical motivations and learning approaches of five high school youth enrolled in a nonprofit after-school music program created to serve young people who would not otherwise have access to music learning opportunities. Participants indicated that eight music learning settings were particularly important to them: 1) school, 2) structured extracurricular activities, 3) private lessons, 4) home, 5) online, 6) out-of-school bands, 7) religious centers, and 8) other informal environments. I also found that participants in my study, though they expressed an interest in music learning in school if courses were available, felt that the school offerings were often not relevant to their interests.

Although research indicates that both in-school and out-of-school environments can support adolescent musicians, in-school settings can pose challenges for some learners. Student motivations, interests, identity, and patterns of musical engagement and participation may at times be out of alignment with curriculum and pedagogy in formal learning environments. Building on research by Radocy (2001), McPherson and Hendricks (2010) note that competitive emphases in U.S. high school music programs may lead to “(a) restrictions in learned repertoire, (b) limited opportunities for an elite minority of students, and (c) a focus on achievement-centered rather than student-centered instruction” (p. 204). Discussing their finding of low in-school student interest in music and high out-of-school interest in music participation, McPherson and Hendricks (2010) write, “Music participation itself may not be what is undervalued, but that music study in U.S. schools may not presently serve a broad population of students in ways that sufficiently promote the values of music for them at the individual level” (p. 209). The researchers recommend that in-school music instruction be more accommodating to

a broader range of individual forms of expression and that more opportunities be provided in-school for autonomous self-directed learning.

Green (2002) has investigated how popular musicians learn in and across multiple settings in the United Kingdom. The settings in which students engaged in music came to feature prominently in Green's research, not because she operated within a theoretical framework that assumed the importance of multiple settings in popular music learning, but because setting was an emergent theme in her data. Green's conclusions align with the position of the National Research Council (Bell et al., 2009) that an overemphasis on in-school and formal learning environments is "fundamentally at odds" (p. 26) with the ways in which people learn in and across multiple settings. She asserts that music learning practices among popular musicians often differed from those of classical musicians. Green found that popular musicians tended to learn through listening to and copying music on their instrument or with their voice, as opposed to reading music using standard Western European notation, which she argued is a more common approach among students of classical music. According to Green's research, popular musicians engaged in learning across a range of settings—jamming with friends, practicing at home by themselves, private lessons—and utilized self-directed as well as peer-directed learning approaches. Green emphasizes that in-school music learning in the United Kingdom was not always aligned with the music learning desires and motivations of many potential participants.

Campbell (1995) also explored the music learning of adolescent popular musicians and concluded—similar to Green—that the learning practices of popular musicians have a unique logic and structure. Campbell noted the importance of listening skills, self-directed practice, and the group learning process whereby more experienced musicians would mentor an increased number of beginning band members. Campbell, whose study focused on nine teenage youth in

Seattle, concluded that there may be a misalignment between school curriculum and the interests of many young musicians. In her work, she considers ways the school curriculum might be made more relevant to music students given their interests and patterns of musical participation.

Research and experience show that popular music is important to many teenagers. Non-formal learning environments, for many adolescent learners, are important components of a learning ecosystem. These environments seem to be well suited for the flexible, student-organized learning practices that often accompany learning in popular music.

Knowledge Gaps and Integrative Possibilities

I will highlight four key gaps in the research literature that I will address with this inquiry. I summarize each below.

Underrepresented populations. Low-income and racial/ethnic minority learners have been underrepresented in the music education research literature. Based on my review, very little empirical work has been done to understand the supports and barriers to music learning facing these students. National data (U.S. Department of Education, 2009) show that there are gaps in musical knowledge and skills by socioeconomic status, race/ethnicity, school type and location, and gender. Evidence shows that low-income and racial/ethnic minority students participate in music education less frequently than higher-SES (often White) peers. Additionally, the quality of music education programs available to low-SES students is often lower than the quality of music education programs available to higher-SES students. There is a need to understand why this is the case, to better scaffold students, and to inform those who directly support them. Further, multicultural education theory can be applied and adapted to better understand music learning among low-income and otherwise marginalized students and to advance equitable music outcomes.

Theoretical Development. Patterns of music learning and engagement that are often student-driven and personally significant for the learner, and which can take place in and across multiple settings—formal, informal, and virtual—are understudied. Extant research indicates that student-led music learning and engagement traversing multiple settings—formal and informal—are important for adolescents. Much current research in this area does not adequately take into account or integrate—theoretically or empirically—the multiple factors (settings, actors, resources, cultures) that are at play in the learning process. As a result, at a field level, our conceptualization of the music learning process has been limited.

Applying Ecological Theory to Address Inequalities in Music Education. There is a timely opportunity to adapt and apply ecological theories of learning to the empirical study of adolescent musicians. These theoretical ideas, developed primarily outside the field of music education, are very well suited to elucidate complex patterns of music learning and engagement among teenage musicians. An ecological conception of music learning integrates the cultural, environmental, and intrapsychological ingredients of the music learning process that have been independently shown by music education researchers to be significant in the learning process.

Methodological Development. From a methodological point of view, there is an underrepresentation of inferential statistical and mixed methods research methodology in music education research. While there are studies that employ these strategies, there is an opportunity to extend the field in new directions through the use of inferential statistical techniques. I am not aware of existing music education research making use of the statistical analysis of social networks—an approach I will use in this dissertation. Advancing and applying newly developed theoretical concepts and methodological tools to the study of music learning among adolescents—including underrepresented low-income and racial/ethnic minority learners—can

integrate prior work in synergistic ways while generating new knowledge to better understand the phenomenon of music learning, to support it generally, and to address targeted equity issues.

Hypotheses Emerging from Ecological Learning Theory and Restatement of Research Questions.

A central tenant of the ecological theory of learning is that people learn in and across multiple settings, individually and in groups (Bell et al., 2009). It is posited that different kinds of learning environments—formal and informal—have unique affordances for learners. Learners are seen as having agency in their own learning, needing to navigate multiple settings in the pursuit of learning that is meaningful for them. Findings from music education research focused on adolescents are consonant with these notions. Therefore I hypothesize that access to and participation in multiple learning environments—and the quality of these environments—will be positively associated with student music learning outcomes. I also hypothesize that the structure and quality of the learning connections that students form with those who support them will be systematically related to student learning outcomes.

An additional hypothesis that emerges from the ecological perspective is that learning is strongly supported when there is an alignment of learners' interests and motivations with relevant support provided by multiple learning environments and multiple individuals. Therefore, I will test the hypothesis that students who have access to music learning environments that offer resources that align with their own interests and motivations exhibit better educational outcomes than students in music learning environments that offer resources that do not align with their interests.

Drawing from empirical and theoretical work in multicultural education (Banks & Banks, 2004; Banks et al., 2007) and multicultural music education (Anderson & Campbell, 2012), I

hypothesize that if learners engage in patterns of musical participation that are undervalued, underrepresented, or undersupported in formal and informal settings, student learning experiences may be less frequent, less satisfying, and less deep than they would be if musical cultures of students were supported and valued. Research suggests young musicians from low-income or racial-ethnic minority backgrounds may have access to fewer supportive settings, people, and resources. I hypothesize that this could lead to lower levels of music learning than among their more privileged peers.

Again, the four research questions I ask to investigate these hypotheses are:

1. What are the most helpful relationships, settings, and resources that constitute a music learning network?
2. Do students with richer connections to people, settings, and resources in a music learning network exhibit more positive learning outcomes on average than those without these connections? If so, which relationships, settings, and resources are most strongly associated with higher levels of music learning?
3. Do students whose interests, motivations, and goals are aligned with the resources available to them in their learning network exhibit more positive music learning outcomes than students whose interests and motivations are out of alignment with the resources available to them?
4. Are the music learning networks and music learning outcomes of low-SES students different on average from those of high-SES students, and if so, in what ways?

Significance

Why better understand the phenomenon of music learning among adolescent musicians, and why support it? Why investigate inequalities in music learning opportunities and outcomes

and work to promote more equitable arrangements? Music learning and music making have been consistent accompaniments of human endeavor in setting after setting. Research has pointed to both the intrinsic and instrumental benefits of learning in and through music for students and communities (Deasy, Catterall, Hetland, Winner, and Arts Education Partnership, 2002; Seidel, Tishman, Winner, Hetland, and Palmer, 2009). These benefits include the development of instrumental or vocal proficiency, creative self-expression, higher levels of academic achievement, and positive social outcomes (Deasy et al., 2002; Catterall, 2009).

Engagement with music can involve creativity, zest, gusto, creative self-expression, engagement, and even transcendence—looking beyond the world as it is to imagine how it could be. The creation and negotiation of culture and values, exploring common and profound elements of the human experience, and the promotion of social justice are all central to the enterprise of music making and music learning. A rationale for the study of music learning would not be complete without acknowledging at least some of these profound benefits the study of music can afford. The literatures surrounding these affordances and outcomes of music learning are extensive, and I am offering a nod in their general direction. Creativity and creative self-expression are viewed by many as important components of education in general, and engagement with music (and the arts) is recognized to foster these skills and abilities (Greene, 1995). Student creativity and self-expression are under fire in K-12 school cultures that stress and reward performance on standardized tests assessing a narrowing range of increasingly STEM-focused content. Zinn (2003) reminds us that even in troubled times, artists and musicians can transcend—and by that he means offer themselves and others a view of the world, not only as it is, but as it can be. This can be very important. Music making can also be a form of resistance—a way that individuals and groups can challenge power structures and participate in

the creation and negotiation of values and culture in a society (Dewhurst, 2014). Examples of this form of musical resistance can include Negro spirituals, music of the Civil Rights Era, and some rap and hip hop today. Making music allows students to convey emotion to others, to know they have been heard, to experience emotion, and to explore alone and with others what it means to be human.

Education researchers have also been able to explore relationships between music learning and extramusical outcomes—such as academic achievement in nonmusic content areas, college enrollment, and social development—at the national level by making use of several national educational datasets that include a few music-related variables (Catterall, Dumais, and Hampden-Thompson, 2012; Deasy et al., 2002). This research has described the positive associations between music involvement and extramusical outcomes, as well as highlighted unequal participation in music by low-income or otherwise marginalized learners. Catterall and colleagues (2012) have investigated the impacts of music and arts participation on academic, social, and behavioral outcomes using multiple datasets: the National Education Longitudinal Study of 1988, the Early Childhood Longitudinal Study, the Kindergarten Class of 1998-1999, the Educational Longitudinal Study of 2002, and the National Longitudinal Survey of Youth. These researchers conclude that low-SES learners who have high levels of arts engagement do better on average across a range of measures—academic, civic, and behavioral—than low-SES learners with low levels of arts engagement. They find that low-SES learners with high levels of arts engagement have achievement levels closer to, and at times exceeding, those in the general population. Catterall et al. (2012) found that positive non-arts outcomes associated with high-arts involvement can apply with greater frequency and magnitude to low-SES populations. In other

words, benefits of arts involvement may be greater for low-SES groups than high-SES students, and some benefits in fact may be unique to these groups.

Several smaller studies focusing specifically on youth involvement in music have established positive links between music participation and a wide range of academic and social outcomes that are consonant with what Catterall et al. find at a national level for arts involvement in general. Reviews of this research (Deasy et al., 2002; Linsin, 2012b) have catalogued some of the various extramusical outcome measures used by researchers with which youth music involvement is shown to have a positive association. Music involvement has been shown to be positively associated with the academic content areas of reading, math, and writing and has also been positively linked with student formation of self-concept (Linsin, 2012b).

The idea that all students should have equal opportunities to learn has been, and continues to be, a guiding force in schooling in the United States (Banks & Banks, 2004). This notion can and should apply to learning in music and art, and all of the benefits that such engagement affords. Inequalities in music skills and knowledge by SES and race/ethnicity have been documented in multiple ways. Researchers have also shown that patterns of musical participation valued by low-income and ethnic minority students (as well as adolescents in general) may be undervalued and undersupported in formal learning environments. While some supporters would like to incorporate multicultural and culturally relevant curricula and pedagogical approaches in music education, research suggests educators may require more tools and training in order to do so effectively (Butler, 2007; Norman, 1994; Young, 1996). I hope that the results from this inquiry will help to build this knowledge base.

There is a window of opportunity. A current confluence of educational policies, economic realities, technological innovations, and changing ideas about the nature of learning

form fertile ground to empirically investigate the nature of music learning among adolescent musicians using a networked, ecological approach. There is evidence to suggest music education is currently threatened in the United States. In-school music programs face reduction or elimination amid strained budgets and an accountability structure and testing culture that privilege specific kinds of learning in science, technology, engineering, and math (STEM). At the same time, a proliferation of nonprofit music (and arts) programs have emerged—sometimes working in partnership with schools—to provide music learning opportunities for students.

There is an increased availability of technologies that supplement learning within schools and at times transport learning outside of school walls. The Internet and Web 2.0, mobile computing, and cellular devices are all rapidly developing and proliferating technologies that are changing the music learning landscape. These technologies facilitate networked and connected learning and are changing the way learning is taking place. Massive open online courses (MOOCs) allow students to take courses online without a fee. Sugata Mitra (2006) conducted experiments in India and other countries showing that when a computer was provided to students, these students were able to self-organize and direct their own learning, often resulting in large measurable gains in knowledge and skills. Mitra (2014) is now developing what he terms Self-Organized Learning Environments, or SOLEs, in which students pursue learning of personal significance by forming learning connections with one another, accessing content on the Internet, and receiving support from the “granny cloud”—grandmothers who volunteer their time and communicate with students via Web video connection, offering encouragement and support. Blended learning is another example of an approach to learning that harnesses newer technology and involves more of an ecological approach than traditional schooling. With blended learning, in addition to in-school instruction, students engage with online or digital content in ways that

enable them to exercise some control over the setting, time, or manner of engagement with that content (Bonk & Ray, 2006).

Music applications for computers, tablets, and cellular phones are also being developed, and some of these are specifically designed to promote student collaboration, engagement, and creativity and to work alongside, or as a substitute for, other forms of learning (“MusED Lab,” 2016). While in-school music education may be threatened, nonprofit and after-school offerings and new forms of learning—many of which harness new technologies—offer new opportunities for students.

There is a need to better understand how young musicians navigate multiple settings—formal, informal, virtual—and learning relationships as they pursue music learning of personal significance. Music learning, I hypothesize, is an ecological and networked phenomenon. A confluence of factors—K-12 education policy, finance, high-stakes testing, a proliferation of after-school learning, increased educational technologies—is expanding and strengthening existing learning networks as well as catalyzing the formation of new ones. This places a premium on understanding the network nature of learning in general—and for the purposes of this dissertation, music learning in particular.

Music students, those who support them (teachers, peers, family members, and others), policy makers, and researchers may benefit from my research. Results can inform adolescent musicians’ decision making as they form learning relationships and better identify and navigate in and among multiple learning environments. Supporters can use findings from my study to inform their pedagogical decisions and to develop strategies to help students navigate in a learning ecosystem that is often larger than the setting or settings in which a single supporter engages with a student. If supporters are offered a more representative view of the music

learning process than what is currently available in the literature—the multiple settings and connections students navigate—they may be better able to maximize the affordances of the settings in which they engage with learners and become more adept at creating additional connections that will be helpful for students. This inquiry may function as a proof of concept for researchers in the field of music education that may stimulate further empirical research based on the ecologically informed music learning network concept I develop. This may lead to useful knowledge for students, teachers, and family members to maximize student learning in music and to promote equity. If it is true that music learning is distributed among multiple learning relationships (involving several supporters) and multiple learning environments (both formal and informal), systematic information about the mix of settings and relationships most helpful to learners can also inform policy makers and program administrators in creating more effective and integrated educational opportunities and supports for students.

Chapter 2: Building the Music Learning Network Framework

Overview of Framing Theoretical Literatures

Introduction. Students, their supporters, the relationships they have with those who support them, the settings in which they engage, and their culture influence the music learning process. Adolescent musicians draw upon their developing interests, identities, and intrinsic motivation. They participate in learning relationships with teachers, peers, parents, and other supporters in order to navigate in and among multiple learning environments—formal, informal, and virtual—to learn music that is personally significant to them. A challenge from a research standpoint is to create a conceptual framework that is sufficiently complex to account for these critical components of the music learning process, as well as their interactions. A parallel and equally important challenge is creating a framework that is sufficiently focused to lead to insight and progress in a program of empirical research.

To address these challenges, in this chapter I introduce a new theory of music learning that I term the *music learning network framework*. I begin by discussing the primary bodies of prior theoretical work that have informed the creation of the new framework. I then describe the framework's primary features, and provide a few examples of its application. Finally, I highlight which hypotheses from the theory I will be investigating empirically in this inquiry.

Ecological learning theory, multicultural theory, and social network-related theories all inform the creation of the music learning network framework. Social network analysis, while not a theory per se, is very well suited to the task of visualizing and understanding the relationships between learners and those who support them in situ. For example, theories of social or cultural capital intersect with network approaches and can meaningfully inform a theory of music learning. Changes in the educational landscape—e.g., increasing student participation in

informal, blended, and online learning—have stimulated self-directed, autonomous, and semi-autonomous student learning. While music education technologies are not referenced extensively, the music learning network framework is attentive to the accelerating changes in the field of music education catalyzed by the development and implementation of new technologies.

Ecological Learning Theory

Ecological theories of learning, including the influential ecological systems theory of Bronfenbrenner (1977), emphasize the intrapersonal, interpersonal, contextual, cultural, and temporal dimensions of learning. According to ecological learning theory, cognitive and affective processes occurring within the learner, her relations with others, the contexts in which she engages in learning, cultural influences, and the development of these dimensions over time all matter in the learning process. Research suggests that all of these elements actively relate to music learning outcomes for adolescents. Independent and complementary strands of research can be synergistically integrated within an ecological framework to create a more comprehensive representation of the music learning process. An integrative ecological learning framework proposed by Bell et al. (2009) is particularly well suited to the task of integrating currently disparate lines of music education research. I will describe the theory in more detail below.

The ecological framework proposed by Bell et al. (2009) asserts that people, places, and culture are present in all forms of learning. This theory, grounded primarily in cognitive and sociocultural traditions, maintains that people learn in and across a range of settings and that learning can be best supported when students' identities, interests, motivations, and culture are considered in the design of learning environments, pedagogical techniques, and curriculum content. According to the theory, an important goal is to integrate multiple student learning experiences across settings to develop synergies—to maximize ecological connections—in the

support of learning. The ecological theory emphasizes the importance of alignment of a student's goals and motivations with situational resources within and across settings in generating powerful learning experiences—a phenomenon termed “contingency” in their framework.

The ecological framework created by Bell et al. (2009) builds upon the ecological systems theory of Bronfenbrenner (1977) and is especially attentive to Bell et al.'s articulated interest in integrating divergent theoretical camps among education researchers, with the goal of facilitating more cohesive and productive dialogue and research in the field. The ecological framework put forward by Bell et al. (2009) has three lenses: 1) people-centered, 2) place-centered, and 3) culture-centered. Examining the phenomenon of music learning through these lenses serves to integrate and advance complementary strands of research in music education.

People-Centered Lens. The people-centered lens in the ecological framework is concerned primarily with the intrapsychological phenomena related to learning. The learning outcomes highlighted by a people-centered lens include the development of knowledge, interests, motives, identity, and affective responses (Bell et al., 2009). It is emphasized that a people-centered lens is different from a strictly cognitive perspective, though both tend to use individuals as the unit of analysis. A people-centered framework—more than a strictly cognitive approach, which tends to focus on intrapsychological phenomena—is concerned with social interactions, practices, and emotions. By contrast, interpsychological phenomena are also visible through the people-centered lens.

One prominent feature of the people-centered lens is its use of research from the learning sciences. Convergences of findings from the learning sciences—a multidisciplinary approach, applying various forms of scientific inquiry to understand how people learn—have been summarized in the influential volume *How People Learn* (Bransford et al., 2000). According to

the report, findings from large bodies of education research converge in ways that the authors posit are centrally important in education: 1) the fostering and use of active learning and metacognitive strategies among students, 2) the importance of pre-existing knowledge and beliefs, 3) learning with understanding, 4) and the importance of context and community. These concepts were summarized in Chapter 1.

Several strands of music education research are brought into focus when viewed through a people-centered lens. Student identities and musical identities have been repeatedly recognized as salient ingredients of learning in music education (Tarrant, North & Hargreaves, 2002). Researchers state that engagement with music functions to create a component of a young learner's personal identity and that within music itself students develop musical identities, which can be expressed in various ways, such as instrument choice or musical genre (Hargreaves, Miell & MacDonald, 2002).

Student motivation to learn music—and the correlation between levels of motivation and levels of learning—has been a recurrent theme in music education research. In multiple quantitative analyses, levels of student motivation have been positively and significantly associated with music learning outcomes (McPherson & McCormick, 2000; Renwick & Reeve, 2012). Research also suggests that engagement with music helps students to experience and to process emotions (MacDonald, Hargreaves & Miell, 2002). Green (2002) highlights the central role of learner-led, goal-driven activity in her study of the ways popular musicians learn music. I also found in research I conducted (Linsin, 2012a), that student interests and goals were axiomatic to the learning process. They were the *sine qua non* of music learning, which for students in my study involved voluntary engagement in after-school music-making activities and get-togethers with friends. Research by McPherson and McCormick (2000) indicates that

measures of student motivation are positive and statistically significant predictors of music performance. Research also suggests that student motivation for music learning may be sensitive to setting, with some research findings indicating that student motivation for music learning in the United States is higher in out-of-school as compared to in-school settings (McPherson & Hendriks, 2010; McPherson & O’Neill, 2010).

Metacognition—the ability to actively monitor and modify your own learning—is positively linked to expert performance in a domain (Bransford et al., 2000). Hallam (2001) found that metacognitive strategies are employed extensively among seasoned musicians, while novices’ uses of these strategies were at times less developed and less uniform. Researchers also state the importance of valuing students’ prior knowledge and tastes in educational settings (Anderson & Campbell, 2010).

There is a substantial body of correlational and descriptive research, largely grounded in cognitive theories—often drawing upon national datasets or meta-analytic techniques—that demonstrates broad positive associations between youth participation in music and extramusical—cognitive, social, civic—outcomes. This body of research is sometimes referred to as “instrumental” (how engagement with music may help learning or development in non-music specific domains), as opposed to research targeting music-focused outcomes. Vaughn (2000) explored the frequently asserted relationship between music and mathematics—using meta-analysis to combine 20 correlational designs—and concluded that there was a small but positive association between music participation and mathematics ability. Further, she conducted a separate meta-analysis of six experimentally designed studies, concluding that there is evidence for a causal relationship between music participation and modest gains in math performance.

Hetland (2000), also utilizing a meta-analytic approach, concluded that a modest but robust association exists between music participation and spatial-temporal reasoning ability.

While the research highlighted by a people-centered lens has multiple foci, hails from many disciplinary ports of call, and utilizes different forms of data and analytic techniques, common strands of meaning emerge that shape our understanding of the intrapsychological processes involved in music learning. Student motivational factors, identity, emotion, metacognition, and prior knowledge have all been linked to music learning and at times musical outcomes, including musical performance ability.

Place-Centered Lens. The ecological approach maintains that learning processes and outcomes are significantly influenced by the settings in which they take place and the activities, materials, and features of those settings (Bell et al., 2009). The place-centered lens, grounded in sociocultural theory and in situated learning perspectives, seeks to highlight features of learning processes and outcomes as they are influenced by the settings in which they take place, as well as the resources available in those settings. Bell et al.'s (2009) crafting of the place-centered lens was influenced by the work of Lave and Wenger (1991). Lave and Wenger advanced the notion of communities of practice—a group engaged in a shared practice or activity such as medicine, carpentry, or music. Novices in a community of practice move from the periphery of the community towards the center by means of a process Lave and Wenger term “legitimate peripheral participation” (p. 29). Legitimate peripheral participation resembles an apprentice model in which beginners in a community interact with more experienced members in progressively more responsible ways. Through this process a novice practitioner moves from the periphery of a community of practice towards the center, ultimately becoming an expert herself.

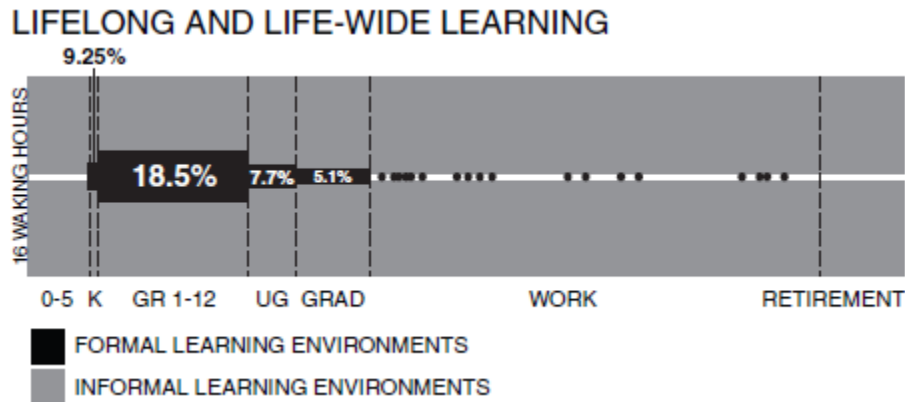
When learning is viewed from situated learning and distributed cognition perspectives, the unit of analysis may shift from the individual learner and her internalized mental learning outcomes to groups of learners engaged in group activity and with the resources available in a particular setting. Hutchins (1995) writes, “The properties of groups of minds in interaction with one another, or the properties of the interaction between individual minds and artifacts in the world, are frequently at the heart of intelligent human performance” (p.62). Rogers and Ellis (1994) write about the distributed cognition approach, “The central unit of analysis is the functional system, which essentially is a collection of individuals and artefacts and their relations to each other in a particular work practice” (p. 5). Learning outcomes, when viewed through a place-centered lens, could involve patterns of participation and activity and performance of groups of students, as well as the quality of their learning relationships.

A place-centered lens brings into view several strands of music learning research that explore multiple settings in which music learning occurs. These settings—formal and informal—include schools, private lessons, after-school programs, the home, performances, and community settings. Different settings may have unique benefits for students that act synergistically to support multiple dimensions of music learning. Helping learners navigate multiple music learning settings and designing these environments in ways that are relevant and accessible to students from diverse backgrounds are emphasized by researchers as being important in fostering robust learning experiences (Bell, Tzou, Bricker & Baines, 2012).

Figure 2.1, created by researchers at the Learning in Informal and Formal Environments (LIFE) Center at the University of Washington, visually displays the time spent in informal and formal learning environments across the lifespan. The area of the entire rectangle represents the total waking hours in a human life. The darker shaded regions of the graphic represent the

waking hours that are spent in formal learning environments (for someone who completes high school, college, and graduate school). The lighter shaded regions represent waking hours spent outside of school that might be used to engage in non-formal learning.

Figure 2.1. Estimated Time Spent in School and Informal Learning Environments



Source: National Research Council, 2012, p. 29.

Note: This diagram was originally conceived by Reed Stevens and John Bransford to represent the range of learning environments being studied at the Learning in Informal and Formal Environments (LIFE) Center. Graphic design, documentation, and calculations were conducted by Reed Stevens, with key assistance from Anne Stevens (graphic design) and Nathan Parham (calculations).

In the diagram it is possible to see the large proportion of waking hours spent outside of schools as opposed to in them. The graphic is intended to highlight the large and at times untapped potential of nonschool learning environments for students.

When looking across the music education research literature, we encounter research focused on music learning in formal environments—in schools, in bands or orchestras, and in private instruction. We also find a growing body of research that investigates the kinds of music learning that take place in non-formal or informal settings such as garage bands and get-togethers with friends after school. According to Bell et al. (2009):

Informal environments are generally defined as including learner choice, low-consequence assessment, and structures that build upon the learners' motivations, culture and competence. Furthermore, it is generally accepted that informal environments provide a safe, nonthreatening, open-ended environment for engaging. (p. 47)

Formal learning environments—i.e., in-school settings—were characterized in the same report as being evaluative and high consequence, mandated, and primarily structured by people other than the learner.

A majority of music education research focuses on music learning in formal environments. Non-formal music learning has recently been receiving increased attention from music education researchers. A prominent example of this work is a study focusing entirely on how popular musicians learn (Green, 2002). Researchers in community music are among those developing theory to explain ways that music learning and music making take place in and across, local, global and virtual settings (Higgins, 2012).

Culture-Centered Lens. The central importance of culture in learning has been increasingly recognized by education scholars and researchers (Bell et al., 2009). The seminal work of Vygotsky (1978) drew attention to social and cultural dimensions of human learning and development. Sociocultural theories learning, which developed in part out of concern for what proponents believed was an overemphasis on individual thinking and learning, asserts that individual learners develop primarily through their involvement in cultural practices (Rogoff, 2003; Heath, 1983).

Bell et al. (2009), borrowing from Rogoff (2003), point to two facets of cultural activity that they assert are important to understanding learning. The first is that culture is “bidirectional and dynamic” (p. 39)—individual learners both influence and are influenced by the cultural

communities they engage with. They mutually form and shape one another. The second is that culture may be distributed differently among group members, with individuals also often participating in multiple cultural communities. Bell et al. (2009) also state that culture—as construed in their framework—is not equivalent to race/ethnicity, social class, or occupation. They argue, as do Gutiérrez and Rogoff (2003), that individuals’ and groups’ “histories of engagement in cultural practices” (p. 19)—termed “repertoires of practice” by Gutierrez and Rogoff—should be a primary focus for those who study cultural variation in approaches to learning, as opposed to static individual traits. According to Gutiérrez and Rogoff, study of cultural variation in learning should be directed toward regularities in shared learner engagement over time—a community jazz band preparing for a concert, for example. The researchers critique studies of cultural variation that locate culture within individuals or groups, often focusing on static traits such as race/ethnicity or gender, arguing that culture is dynamic, and individual participation in cultural activities may change and develop. Further, they argue that an individual learner may participate in multiple cultural communities.

The culture-centered lens highlights strands of music learning research that investigate the social affiliations through which learners develop skills, practices, identities, values, and purposes in their music making. Some ethnomusicologists, whose work can be thought of as residing in a culture-centered lens, have suggested that music learning environments be modified to support the music learning of students from diverse backgrounds by valuing and utilizing these students’ existing cultural practices in support of their learning (Anderson et al., 2010).

Taken together, the people-centered, place-centered, and culture-centered lenses of the ecological framework outlined here bring into focus multiple complementary and interrelated strands of music education research that have a bearing on the music learning of adolescent

youth in formal and informal settings. All three lenses—people-centered, place-centered, and culture-centered—provide important perspectives. The place-centered lens proves particularly useful when thinking about learning that takes place in and across multiple settings. The culture-centered lens brings important work into view that has the potential to support the music learning of low-income and marginalized youth whose musical practices and values may not be recognized in many formal educational environments. The people-centered lens highlights work from the learning sciences related to how people learn and important research in music psychology investigating the roles of student identity and motivation in learning.

Music Education and Equity. An understanding of how people learn in formal and informal educational environments does not necessarily lead to equitable learning outcomes for all students. Multicultural education is a set of theories and practices concerned with educational equity and has been adapted and applied by some to the field of music education. Banks (2004) writes, “A major goal of multicultural education, as stated by experts in the field, is to reform the schools and other education institutions so that students from diverse racial, ethnic, and social-class groups will experience educational equality” (p. 3). With music as with other school subjects, a goal of educational equity requires careful attention to the supports and barriers to music education encountered by low-income and marginalized students.

Social Network Related: Networked, Blended, Autonomous, and Self-Organized Learning. A prominent feature of social network analysis is its focus on relationships—their structure and implications (Wasserman & Faust, 1994). While multiple theoretical concepts were associated with the development of social network analysis in many social science fields and disciplines, for the purposes of building a music learning framework, I am particularly interested in the affordances of social network analysis for understanding the structure and patterns of

relationships between music students and those who directly support them, as well as the ways these relationships correlate with learning. Social network analysis provides useful theoretical and analytical tools for the job.

The development and implementation of new technologies is transforming the music education landscape, often creating new opportunities for connection. Computers, online resources, cellphone applications, tablets, music software, and electronic instruments are all examples of technologies that are changing the way music making and music learning occur. The Media Lab at the Massachusetts Institute of Technology, the Music Experience Design Lab at New York University, and similar environments—often involving university-industry partnerships—are actively engaged in understanding the needs and barriers of music learners and harnessing technology to develop and implement interventions to address them. Technological innovations often create new ways for students to connect to pursue learning of mutual interest and to provide ways students can learn outside of school. A theory of music learning needs to bring developments in music technology into focus—as well as the networked, blended, and distributed learning that they promote.

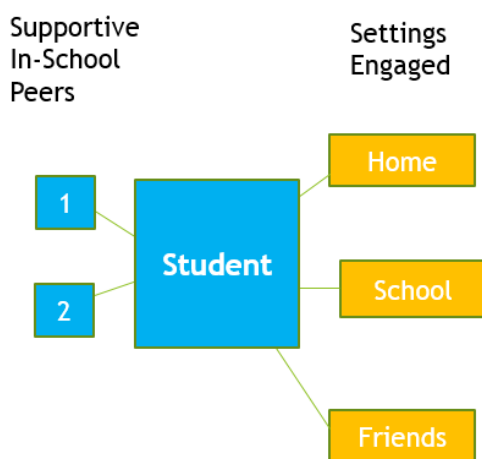
The Music Learning Network Framework

Building upon the theories I have described, I propose an ecological concept of a music learning network that makes visible the integral and interrelated elements of the music learning enterprise and that facilitates empirical inquiry into how students learn music. The music learning network framework has six dimensions: 1) learners, 2) supporters (teachers, peers, family members), 3) learning relationships, 4) settings and resources, 5) culture and context, and 6) equity. I will describe each dimension below.

Learners. A learner is a person who engages (individually and in groups) with educational content. According to the framework, an individual learner is driven to learn in part by internal motivations, interests, and identities. Individual learners possess some degree of autonomy by which they choose to participate or not in learning environments available to them and engage in learning relationships with those around them. Individual learner histories and attributes—such as time spent with an instrument, or preferred styles of music—are relevant in the learning process.

Using the concept of an ego network from social network analysis, we can represent individual learners in the framework in a way that includes their histories and attributes, the immediate relationships they have with those who support their learning, the constellations of learning environments they have available to them, and the subset in which they choose to engage. For example, in the figure below, the student has been playing the trumpet for four years. She reports learning music at home, in school, and outside of school with friends. She identifies two supportive peers in school.

Figure 2.2. Simplified Representation of Learner Ego Network



These settings and supporters, combined with this learner's history and attributes, constitute the individual or ego learning network for the student in the center of the figure.

Learner agency is construed as both the universe of potential learning relationships, settings/resources, and settings available to a student, as well as the subset of the available entities with which a student chooses to engage. A learner's ego network is a representation of the connections, settings, and resources in and through which a student has chosen to engage. It is a way to operationalize and make agency visible.

Supporters. A supporter, according to the music learning network framework, is anyone who provides direct help to a learner as part of an effort to help that individual learner. Supporters can occupy different roles in a learner's life. They can be teachers, peers, or family members. The role a supporter occupies may be suggestive of the type of learning activities that take place with the learner. A private instructor may engage more frequently and intensely with a learner on topics related to musical performance techniques than a parent, who might interact musically with a son or daughter (the learner) in less formal ways—introducing new music and sharing personal stories. As with setting, the relationship between supporter, role, pedagogy, and content is not deterministic. Parents may teach instrumental technique, and private teachers may jam informally with learners. A supporter's role may be correlated with pedagogical approaches and areas of content. Supporters' attributes and histories may interact with those of learners and influence the nature of the learning relationship; that interaction may be systematically related to student learning outcomes. Individuals in a music learning network may also have multiple roles. For example, a learner may also be a supporter of another student.

Learning Relationships. According to the music learning network framework, a learning relationship is defined as an interaction between a music learner and supporter in the presence of educational content. A claim of the framework is that the quality and structure of a learner's learning relationships are likely to be related in some kind of systematic way to learning

outcomes. Further, music learning outcomes can occur at multiple levels: individual, dyadic, and groups of various sizes.

Learning Relationship Quality. If we visualize the learning relationship as a channel or conduit between a learner and supporter, we may also become interested in the properties of the conduit itself, including what flows through it. The quantity of time learner and supporter spend together can be represented by the conduit's diameter—the more time spent, the larger the opening. The relative importance of the connection to the learner can be thought of as the pressure of the substance—e.g., the support offered by a teacher to a student—that flows through the conduit. The experience and expertise of the supporter can be thought of as the quality of the substance that flows to the learner. For example, an expert teacher may provide very nutrient-rich support to a student, while a less-experienced teacher may provide support that is less rich. The type of musical engagement between learner and supporter—e.g., the style of music played, or whether learning takes place inside or outside of school—can be analogized to the texture of the substance in the conduit. Whether the learner and supporter are also friends may influence the learning connection.

Learning relationships can be unidirectional, flowing in one direction from supporter to learner, or they can be reciprocal, with each network actor possessing a dual role as both supporter and learner. Whether or not a learning connection exists at all between a learner and potential supporter is also meaningful information. The music learning network theory asserts that not all learning relationships are equal, and the quality of learning connections may be systematically related to music learning outcomes.

Learning Relationship Structure. Learning relationship structure refers to the configuration of students and supporters and the aggregate presence or absence of learning

relationships that exist between them in a music learning network. There are multiple ways of considering position in a music learning network, and multiple types of relational patterns that may be relevant to music learning outcomes. From the perspective of an individual learner, a relevant index could be her centrality in a network—all musicians in a high school, for example. Centrality in social network literature research is a measure of an actor's degree of connectedness in a network (Wasserman & Faust, 1994). While this measure can be calculated in different ways, higher levels of connectedness—more learning relationships with peers and teachers, for example—would correspond to higher levels of centrality.

The concept of an ego network can also be employed to better understand the structure of learning relationships an individual learner has. A learner's ego network consists of the learner or "ego," and all learners and supporters to whom she is directly connected, sometimes referred to as "alters" in the social network literature (Wasserman & Faust, 1994). An example of a structural feature of an ego network would be density, defined as the observed number of ties in the ego network divided by the total number of possible ties.

All learners and supporters in a given setting, such as a high school, and all of the learning ties among them constitute a full learning network. Unique and measurable properties emerge at full-network level of analysis. Many of these network-level measures are well summarized in the social network literature (Wasserman and Faust, 1994; Daly, 2010). While it is beyond the scope of this analysis to describe these established measures, I will identify several by name:

- *Density*: the proportion of observed ties to possible ties in a full network divided by the number of possible ties.

- *Reciprocity*: the tendency of relations to be symmetric—that is, if student A learns from student B, then student B also learns from student A.
- *Transitivity*: the likelihood that a learning relationship exists between student A and student C, if a learning relationship exists between student A and student B, and a learning relationship exists between student B and student C.
- *Network components*: isolatable subgroups within a network.

Learning Relationship Level and Learning Outcomes. Learning can be conceived of as occurring at multiple levels. To learn music is at the most fundamental level to engage with it. Learning can occur as a strictly mental phenomenon—experienced musicians will sometimes practice by closing their eyes and thinking their way through a piece of music. Learning music can take place individually and involve engagement with resources—think of a student playing a piano alone in a practice room, or a guitarist listening to a recording of his favorite guitar solo again and again, attempting to learn to play the solo himself. Learning music can also be a collective process: a saxophonist taking private lessons, a choir practicing together, a general music education classroom in a primary school, or a group of friends jamming in a parent’s garage after school.

The specific learning outcomes valued in music might be as numerous as there are musicians themselves, philosophers of music education, music education practitioners with explicit or implicit ideas about what is worth learning, education researchers armed with theories and prior research, and music education policymakers creating policy frameworks. The music learning network is flexible enough to accommodate multiple learning outcomes at multiple levels of aggregation. Elements such as identity may be predictors of music learning, outcomes of music learning, or both. I believe that arriving at well-formed ideas about what is worth

learning—what should be learned—in a particular content area means synthesizing information from multiple sources. This includes students themselves and what they value, ideas flowing from experts in the domain, and voices from the education community. These conversations are evolving over time and are dependent to some degree on the contexts in which they take place.

In this analysis, a musician is a person who plays an instrument or sings—at any level of proficiency. She need not be, though she could be, interested in becoming a professional musician, studying music in college, or making music a large part of her life. Therefore, in this case music learning outcomes involve, at least to some degree, the development of proficiency in playing an instrument or singing.

A key point is that music learning outcomes can be understood to exist at multiple levels. Five levels are particularly prominent using the music learning network approach.

1) *Ego level/ individual learner.* Learning at the level of the individual involves the development of instrumental or vocal proficiency and can involve the development of other intrapsychological elements such as identity and interests.

2) *Dyad level/ individual learning relationships(s).* Learning is considered to reside in the relationship between a learner and supporter(s). These connections represent music engagement axiomatic to learning. The quantity, quality, and structure of these relationship are all relevant to learning outcomes.

3) *Ego network level.* Properties of the constellation of learning relationships in a network, either directly connected to the learner, or close in, with the individual learner at the center.

4) *Subgroup level.* Moving beyond the level of the individual student's learning relationships, we consider other subgroups in a music learning network. All jazz musicians in the

city of New Orleans and the learning connections between them would be an example of a subgroup. Jazz in New Orleans could itself be considered a relational group learning outcome. Another example would be a rock band. The learning connections among band members would constitute the music learning network subgroup. An example of an outcome could be a concert the band plays after some period of time.

5) *Full network level/ bounded group(s) of learners.* Learning may be distributed among multiple members in a learning network. An example is members of a band practicing. Learning at the group level may be more than the simple summation of individual learning within the group, as a symphony performance is greater than the sum of the playing of each individual member. Multiple music learning networks exist.

These five levels of music learning outcomes are not entirely separable from one another. Individual learning may potentiate and influence the formation of learning connections. Extant learning connections act to influence individual learners. Learning can be distributed across the levels described here. The typology of learning outcomes is intended to draw attention to partially separable, qualitatively distinct dimensions of learning. Naming, describing, and investigating these dimensions hold the potential to advance the field of education in general and music education in particular.

Settings and Resources

Setting is defined as the geographic or virtual space in which learning takes place. The structure—physical and social—of a setting and the resources associated with that setting may foster different kinds of learning. A preliminary iterative process can be employed to gather information about which settings are likely to play important roles for students. As I discussed in Chapter 1, prior to my dissertation work I conducted a pilot study (Linsin, 2012a) in which I

asked high school musicians to tell me where they engaged with music. Through a qualitative data analysis process, I examined commonalities across individual student responses and assembled a list of settings students identified as being particularly important to their music learning. Again, the settings I identified were: 1) school, 2) structured extracurricular activities, 3) private lessons, 4) home, 5) online, 6) out-of-school bands, 7) religious centers, and 8) other informal environments. These largely mutually exclusive settings became areas of exploration for future inquiry, including this dissertation research. I do not presume this initial list of eight settings is exhaustive or necessarily generalizable. It is the result of a coarse calibration of the framework and forms a starting point for subsequent fine-tuning.

According to the music learning network approach, different settings may have different affordances, or advantages, for learners. For example, private lesson settings may be very well suited to help students develop performance abilities, while home environments may be conducive to nurturing creative musical engagement. Settings tend to privilege particular forms of education content and educational approaches. Settings also may facilitate or constrain the formation of types of learning relationships. Schools may promote peer-to-peer learning or discourage it, instead placing emphasis on teacher-focused instruction. Physical characteristics (or technological features) of learning environments may also shape network connections—students at desks in relatively isolated classrooms may collaborate less frequently than students who regularly utilize shared workspaces.

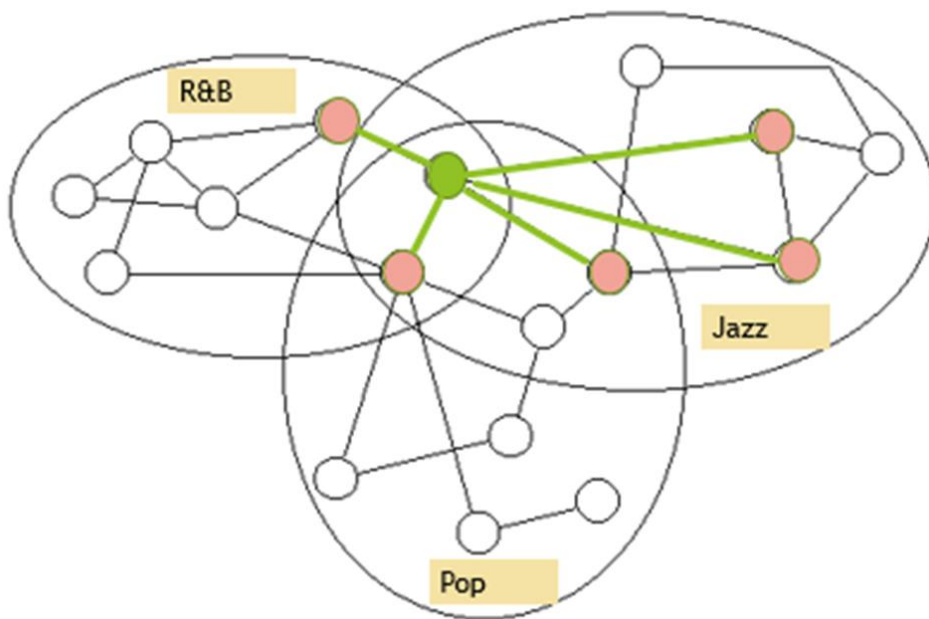
Culture and Context

Many scholars argue that culture is central in the learning process. Gutiérrez and Rogoff (2003) promote a conception of culture as repertoires of practice—individuals' and groups' histories of engagement. The music learning network approach allows us to make these patterns

of participation visible. Visualizing, and to some degree concretizing, notions of culture within our framework allows us to delicately move an often amorphous, yet central, component of music education into a place where we can make progress through research. We can document, visualize, and better understand multiple cultural practices in music in the contexts in which they take place, and use this understanding to promote educational equity.

To illustrate this point, imagine a music learning network that is composed of all adolescent musicians in a high school. Figure 2.3 visually represents this peer learning network.

Figure 2.3. High School Peer Music Learning Network Example



The network is populated by the young musicians and their learning relationships. In this example, for the sake of clarity, the learning network includes only peer-to-peer learning ties within one school. The circles in the sociogram represent adolescent musicians; straight lines indicate the presence of a learning relationship (reciprocal or unidirectional) between peers. The resulting web represents the complete peer learning network that exists within the boundary of a

school. The boundary is to some extent artificial—learning ties may in fact extend between schools or around the world—but is helpful to simplify the example in considering learning in a particular context. Musicians—the only actors in this network—may be both supporters and learners. The ellipses (or oval shapes) bounding sets of nodes and relationships, and their associated labels (R&B, jazz, and pop), show which musicians in the school play which kinds of music. Some student musicians play one style, while others play multiple styles.

Recall the network learning levels described above. In this diagram, imagine that ego is represented by the green node. A learning relationship dyad is represented by the presence of a line connecting two nodes. Alters are the pink nodes. The green node, green ties, and pink nodes constitute the green node's ego network. Music genres, demarcated by ellipses in the figure, represent subgroups. All nodes and learning ties make up the full music learning network.

In this example, Gutiérrez and Rogoff's notion of histories of engagement in cultural practices (2003) can be analogized to musical genre. Musical genres—jazz, rock, classical, rap, hip hop are all examples—*are* histories of engagement in cultural practices. Each of these genres involves an evolving network of musicians performing together, exchanging musical ideas, performing, listening, teaching, and learning. Employing the concept of genre, we can mentally highlight a subset of that network in which all musicians in the highlighted section (learners and supporters) indicate that they play jazz music, for example. We can now directly observe this pattern of musical participation. We can observe how many or few musicians in this school play jazz. We can note the central jazz players. We can see the patterns of learning relationships in the genre. The music learning network approach enables us to do these things.

Features of culture according to Bell et al. (2009) and Rogoff (2003) are that it is bidirectional and dynamic, with individuals simultaneously influencing and being influenced by

their cultural environment. This dynamism is represented in the framework: individual musicians, their histories and attributes, flow into the network(s) in which they engage, and at the same time, influences from the network are transmitted to the learners themselves. Again invoking Bell et al. and Rogoff, we see that culture may not necessarily be distributed evenly among members and that individuals often participate in multiple cultural communities.

With this in mind, consider ego in the figure above. We can see that she plays jazz and is linked with the in-school group of jazz musicians, but she also plays R&B and pop. She is connected to those communities of practice as well. The music learning network framework allows for an individual's participation in multiple distinct cultural communities and provides tools for visualizing and understanding these varied forms of participation.

We can extend the framework to investigate patterns and histories of participation that characterize different musical genres and the extent to which these patterns of participation are in alignment with music learning that takes place in formal settings. Using the jazz music learning network in our example, we see all of the musicians who are learning and playing jazz music in the school and the learning connections between them. We can then extend the jazz network to include music learning relationships and patterns of musical participation that occur outside of school. We can investigate whether authentic patterns of participation of jazz musicians outside of school are different from patterns observed of rock musicians in school. With our framework we can begin to ask to what extent there is an alignment of the patterns of musical participation in which learners engage with the learning environments available to them.

Learning networks also evolve over time. As in a time-lapse photography series, it is possible to further extend the framework to include the dimension of time allowing us to observe formation and dissolution of learning ties in our network. Learners and supporters enter and exit

the network. The network may become larger or smaller as the school population changes and as music making becomes more or less frequent. If we allow enough time to pass, we may witness the inclusion of new musical genres and possibly the fading away of older ones. We might detect entropic and negentropic forces exerting an attractive or repulsive effect on actors. Generally speaking, a longitudinal network perspective can inform our understanding of how histories of engagement with music and genre interrelate—for example, how blues informed the development of jazz music. We might also observe the trajectory of an individual learning pathway—the movement of a single learner over time in a constantly evolving network.

Equity

Multicultural education recognizes the values, histories, and activities of diverse groups (Gutmann et al., 1994). A contribution of the music learning network approach to multicultural education is making elements of musical culture visible. If we are able to visualize diverse musical practices of individuals and groups, and to better understand them, they can be more effectively supported. Once patterns of multiple forms of musical participation are made visible, we can learn something quantitatively and qualitatively about the degree of alignment between these groups and the learning settings available. An inventory of available music learning environments makes it possible to have some idea of the degree to which these resources are distributed equitably locally, regionally and nationally. The music learning network approach allows us to investigate why differential participation in available resources may occur. While it is not necessarily the case that student characteristics such as race/ethnicity and SES are associated with musical genre or learning style, this is an evolving, context dependent, and empirical question.

Empirical Investigation of Music Learning Network Framework Hypotheses

A multitude of hypotheses emerge from the music learning network framework. In this inquiry I will focus on empirically investigating six of them.

1. Students circulate in and across multiple environments as they pursue learning of personal significance to them.
2. Different learning environments can have different affordances (or advantages) for learners.
3. The quality and quantity of music learning environments in which students engage will be positively related to their music learning outcomes. Low-SES students could be at a disadvantage because lack of resources could lead to fewer (and lower-quality) music learning opportunities.
4. Greater alignment between a student's musical interests and what is valued and represented in the settings in which that student engages will be positively correlated with music learning outcomes. Low-SES students may be at a disadvantage because the music(s) they value may not be represented in many of the settings in which they engage—like school.
5. The quality and quantity of music learning relationships a student has will be positively and systematically related to their music learning outcomes.
6. Positions and patterns of network relationships matter: indegree, outdegree, and other measures of centrality.

Chapter 3: Research Methods

Restatement of Research Problem and Research Questions

We now refocus our attention on the music learning of young musicians. My goal is to better understand their patterns of musical participation and learning in order to support them. I have adopted an ecological perspective enabling me to simultaneously visualize the learners and supporters and the connections among them, as well as the settings and resources in and through which learning frequently takes place among adolescent musicians. Building on ecological theory, I have advanced a new framework—the music learning network—that will allow me to visualize, operationalize, and investigate the phenomenon of music learning. I strive to be particularly attentive to equity issues in music learning, cognizant of current inequalities, the paucity of research focusing on low-income or otherwise marginalized learners, and the significance of music learning opportunities for youth. Additionally, I am aware of the technological developments that are transforming music making and music learning and that foster student-led, networked, and non-formal or hybrid learning contexts. Again, my research questions are:

1. What are the most helpful relationships, settings, and resources that constitute a music learning network?
2. Do students with rich connections to people, settings, and resources in a music learning network exhibit more positive learning outcomes on average than those without these connections? If so, which relationships, settings, and resources are most strongly associated with higher levels of music learning?
3. Do students whose interests, motivations, and goals are aligned with the resources available to them in their learning network exhibit more positive music learning

outcomes than students whose interests and motivations are not in alignment with resources available to them?

4. Are the music learning networks and music learning outcomes of low-SES students different on average from those of high-SES students, and if so, in what ways?

Setting

To investigate these questions I chose to conduct my research in a large city in the northeastern United States. This bustling metropolis supports a vibrant and diverse music and arts scene and offered me the opportunity to connect with the population I hoped to reach in my research: adolescents who, whether recreationally or in a more focused manner, engaged with music making by playing an instrument (traditional or electronic) or singing. The diverse musical genres and spaces for musical engagement offered me the opportunity to learn about multiple patterns of musical participation. The city is also home to numerous music-focused institutions of higher education. Some of these postsecondary settings offer educational programs for adolescents that provided additional opportunities for research collaboration. The large public school system offered multiple possibilities to engage with youth. I was also aware of the existence of some music and arts focused high schools that I imagined could be excellent research sites.

The city is also highly diverse, with non-Hispanic Whites making up approximately 46 percent of the total population, according to the 2013 Census (U.S. Census Bureau, 2013). This racial/ethnic diversity presented the opportunity to incorporate in my research populations who have been understudied. As with many larger eastern cities in the United States, the site I chose has large areas of concentrated and persistent poverty. This offered me the opportunity to connect with learners from low-income families.

Approximately 81 percent of Americans reside in urban areas (U.S. Census Bureau, 2010). While the setting I chose is unique, contextualizing my study in an urban area may make the findings useful to a greater number of people. Poverty in the United States is often concentrated in cities, as are racially/ethnically diverse populations (Iceland, 2013). By locating my research in a large city, I hoped to maximize the likelihood that I would have a representation of these populations in my study and that my findings would be useful to these individuals and groups once the research was completed.

Mixed Methods Research Design Overview

I will provide an overview of some of the major research design decisions I made to guide this inquiry. The research problem is both broad and deep. I am considering learning networks—multidimensional sets of relationships that span school, home, the Internet, and beyond. I am also interested in learner perceptions of interest, identity, motivation, and choice. The social network analysis components embedded in the music learning network framework place some specific requirements on data gathering and analysis. In order to best address the research questions I posed—attending to the broad and deep, at times perception-laden components—I decided to gather both quantitative and qualitative data and chose a mixed methods research design. A mixed methods design enabled me to gather a wider range of data to investigate observable implications of my theory. A mixed methods design enabled me to document and examine music learning networks and to understand how they formed and functioned. Speaking directly with students enabled me to gather their own perceptions of the music learning process and to understand why and how learning networks functioned as they did. Surveys were also useful to efficiently gather learning, demographic, background, social

network, and other kinds of data in a way that would support statistical inference and quantitative descriptions.

Mixed methods research design has been receiving increasing attention in the field of education. Creswell and Plano Clark (2007), two prominent methodologists and proponents of mixed methods approaches in educational research, describe the mixed methods methodological approach this way: “[Mixed methods research] focuses on collecting, analyzing and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that use of quantitative and qualitative approaches, in combination, provides a better understanding of research than either approach alone” (p. 5). These researchers elaborated on this definition in a subsequent publication when they described core characteristics of mixed methods research. In mixed methods research the researcher

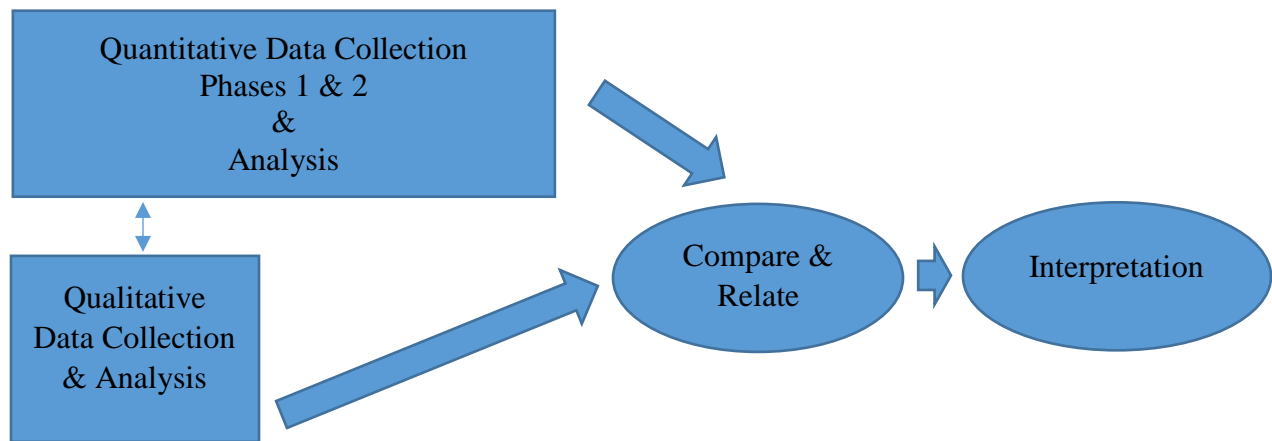
- collects and analyzes persuasively and rigorously both qualitative and quantitative data;
- mixes the two forms of data concurrently... sequentially... or [by] embedding one within the other;
- gives priority to one or both forms of data;
- uses these procedures in a single study or in multiple phases of a program of study;
- combines the procedures into specific research designs that direct the plan for conducting the study. (Creswell & Plano Clark, 2011, p. 5)

These definitions and activities outline some of the tenets of mixed methods research that I implement in this study.

I use a variant of what Creswell and Plano Clark (2011) term a “convergent parallel mixed methods research design” (p. 77). With this design, the researcher “uses concurrent timing to implement the quantitative and qualitative strands during the same phase of the research process, prioritizes the methods equally, and keeps the strands independent during analysis and

then mixes the results during the overall interpretation” (pp. 70-71). Figure 3.1, adapted from Creswell & Plano Clark (2011), summarizes the main features of my design.

Figure 3.1. Research Design



Using a sampling strategy I describe in more detail below, I gathered survey and social network data from students and conducted two focus groups. My design is effectively cross-sectional.

I analyzed my qualitative and quantitative data largely independently for the first phase of data analysis. That is, I focused my attention on either the quantitative or qualitative data I had collected, and analyzed that portion of my data using methods and analysis strategies appropriate to each. I deviated from the convergent parallel design described by Creswell and Plano Clark in that my initial analyses of my qualitative and quantitative data were not entirely separate. I used an iterative and exploratory approach to data analysis overall, and it happened more than once that a finding from my qualitative data analysis caused me to conduct additional quantitative analyses, and vice versa. This mutually informing process is represented by a double headed arrow in the graphic.

After my initial quantitative and qualitative data analyses were complete, I integrated findings from both data sources as I answered my research questions. My research questions dictated the nature and extent of data integration. Two primary goals at this stage of the data analysis were description and inference. I hoped to form a broad and deep representation of music learning and also to move beyond the particulars of my data to something not directly observed. The overall interpretation of my findings would then flow from a combination of description and inference rooted in qualitative and quantitative strands of data.

An advantage of the convergent parallel design is that gathering multiple forms of data allows for a more complete understanding of the phenomena than gathering one form of data (Creswell & Plano Clark, 2011). A further intent is to bring together the different strengths and nonoverlapping weaknesses of quantitative and qualitative traditions (Patton, 1990). Multiple data sources also allowed me to triangulate—to answer research questions through the combination of indirect and complementary findings from my quantitative and qualitative data.

I agree with the view asserted by King, Keohane, and Verba (1994) that the “traditions that are conventionally denoted as ‘quantitative’ or ‘qualitative’ research [can be connected] by applying a unified logic of inference to both” (p. 1). For King et al. (1994), research has the following four characteristics: 1) its goal is inference; 2) the procedures are public; 3) the conclusions are uncertain; 4) and the content is method. While not as stridently or prescriptively as these researchers, I feel these views are largely on target. For King et al., “The emphasis on gathering facts as observable implications of a hypothesis makes the common ground between the quantitative and qualitative styles of research much clearer” (1994, p. 47). Like these researchers and consistent with views expressed by Bell et al. (2009), I believe that

methodological and theoretical orientations can be integrated to achieve cohesion and progress in the field of education.

Ethical Considerations

A major priority throughout this study was to protect the privacy and well-being of participants. I use pseudonyms to refer to all students and institutions who participated in this research and do not disclose the city in which the research was conducted. I designed the study to maximize participation of low-income and racial and ethnic minority students—groups often underrepresented in music education and other social science research. I worked to create data collection instruments—surveys and interview protocols—that would respect the multiple cultural backgrounds of the participants and elicit varying points of view, experiences, and perceptions. Participation in the study was voluntary and required the written assent/consent of participants and the approval of their parents. The purposes of the study and nature of student involvement were clearly articulated. Student names are withheld from the report to protect their privacy, and pseudonyms are used.

I applied for and received approval from the school district in which I conducted the research, and then received additional written approval from the three public schools and one college that participated. I worked to create relationships with school principals and offered to provide schools with research findings in a way that would be useful to them. I have created customized reports and given presentations based on findings from this study to research sites that requested them. I made efforts to minimize any research burden on classroom instruction that my study might create. All teachers involved in the study also provided written consent. I made every effort to be respectful and fully present for participants in the study. I endeavored to

maximize the chances that useful findings from this inquiry would be used to benefit participants directly. Further, the University of Washington Institutional Review Board reviewed and approved all study procedures and materials before the study began.

Sites and Samples

I focused this study on the peer learning networks of adolescent musicians and designed it, in part, to learn something about how music learning was taking place inside and outside of school. As discussed previously, prior research I conducted (Linsin, 2012a) indicated that the following eight settings were particularly relevant for adolescent musicians: 1) school, 2) structured extracurricular activities, 3) private lessons, 4) home, 5) online, 6) out-of-school bands, 7) religious centers, and 8) other informal environments. I collected data for this study that would provide information about student participation in all of these settings. I focused on peer learning music networks of students who attended particular high schools in order to determine whether the learning that was taking place in those networks was occurring primarily within or outside of schools.

Learning networks are complex and multidimensional. Practicability of this research given resources and timeframe was also an important consideration and partial cause of limiting the scope of the work. I decided to focus on peer learning networks because I felt they could give the highest yield in terms of usefulness of the research to both theory and practice. Music education research literature indicates that music learning takes place partly through peer learning networks (Green, 2002). Peer learning networks may also constitute the primary learning relationships present in non-formal music learning environments. Non-formal environments have been identified in the research as important context for music learning (Higgins, 2002). Peer learning networks may also represent the student-led, self-organizing

forms of learning described in the literature (Mitra, 2006). Primarily for these reasons, I collected network data on students' peer learning networks.

Connecting with students in four formal learning environments had multiple advantages. Within schools, I would encounter large groups of learners—many of whom would be engaged in some way with music making and music learning. This was an obvious but significant advantage when recruiting participants. Identifying participants outside of schools has posed additional challenges. It is not the case that I was only—or primarily—interested in the music learning taking place within the schools; rather, schools brought into one location hundreds of potential participants, many of whom lived in the same neighborhood. I anticipated finding a large number of students attending the same school who would also have learning ties that existed outside of school. I might find, for example, two sophomores who do not engage musically in school, but jam together on the weekends. Schools also offered large, bounded networks of students. These larger networks and natural network boundaries allowed me to examine network structures in ways I would not have been able to otherwise. Finally, while I am not primarily focused on music learning in school, surveying students within schools allowed me to investigate network structures in relation to the institutional setting in which they were partially embedded.

While gathering data to best answer my research questions, I also needed to develop a design that could be implemented and met the methodological requirements of my study. It was not feasible for me to collect detailed social network data across all of the settings I identified and to incorporate multiple other network actors. I account for these settings and actors in other ways that I will describe. From a methodological point of view, many social network analysis techniques I utilize require that a network have a defined boundary (Wasserman & Faust, 1994).

Students attending a school program provided sensible, plausible—though admittedly in some senses, artificial—network boundaries.

I conducted my research in three inner-city public high schools serving large proportions of low-income, racial and ethnic minority, and English language learner students and in one residential summer musicianship program at a prestigious music college that enrolls primarily high school juniors and seniors. I chose two music-focused and two non-music-focused sites in order to recruit participants who were already somewhat experienced, and in some cases committed, musicians, as well as students playing an instrument or trying out singing for the first time, who did not necessarily intend to pursue music beyond high school (or in some cases, beyond the course in which they were enrolled).

The college administered an outreach program in which all of the high schools in my sample participated. I tried to include all students in the summer musicianship program and all students enrolled in music classes at my high school sites in the study. I restricted my sample within high schools to students enrolled in music classes for two reasons: 1) to increase the likelihood I would be connecting primarily with my target population—students who play an instrument or sing, and 2) to limit the participants in this study to a number that would be manageable. Further, in the two non-music-focused high schools, students were required to enroll in at least one music or arts course in order to graduate. Because all students in these high schools are required to take music (or art) at some point, it is more likely that the composition of music classes are more representative of the school population as a whole, and not the subset of students who would have self-selected into music absent the specific requirement. In the third high school, which was focused on performing and visual arts, I tried to include all students enrolled in the music concentration at the school. Students in all sites were surveyed towards the

end of their programs—the end of the school year in the case of the high schools, and in the final week of the summer musicianship program. Conducting the survey near the end of the program and school year enabled students to draw upon a complete-as-possible memory and experience of the program when answering the questions.

On the survey, students nominate others in their programs who have been most helpful to their music learning and describe these relationships; they provide information about their musical background, goals, and preferences; they indicate which settings and resources are most helpful to them in the pursuit of their musical goals; they describe the kinds of learning that take place in the settings in which they engage and provide information about the quality of the environments; they describe obstacles they may have faced in the learning process and provide reasons for non-participation in settings; and, finally, students also share demographic information. Focus group questions were designed to elicit rich descriptions of students' perceptions of the music learning process and their thoughts about how and why it worked the way that it did.

Sample Inclusion and Exclusion Criteria. Four hundred and twenty-five students took the survey and 11 participated in one of two focus groups. All enrolled students in the high school sites who were taking at least one music class in the school surveyed, during the academic year in which the survey was conducted, were eligible for participation. All students enrolled in the Wes Montgomery summer musicianship program who were also high school students, including newly graduated seniors, were eligible. Students over 19, a small minority in the program overall, were ineligible to take the survey. Some surveys, completed online or on paper, contained unreasonably large numbers of missing responses. In some cases, students began an online survey but answered no questions. In other cases, the large majority of responses were left

blank, leading me to question whether any of the information on the survey was meaningful. To handle this problem, I dropped all observations with what I judged to be excessive proportions of missing data. I set the threshold at approximately ≥ 60 percent of the questions were unanswered. Applying this threshold, I eliminated 78 observations from my data, or approximately 18 percent of the total sample. The final sample consisted of 347 students.

Sample Descriptive Statistics. The tables below array descriptive statistics for the full sample and research sites. The variables included in the tables will be more fully defined later in this chapter. I report the mean, standard deviation, minimum, and maximum values for the full sample and mean values for each of the four research sites. Given some missing data, the number of students for whom I have data can change somewhat from variable to variable.

Table 3.1. Descriptive Statistics for Full Sample

Sample Descriptive Statistics					
Variable	N	Mean	SD	Min	Max
performance	309	5.53	2.06	1	10
theory	304	5.35	2.12	1	10
time total	310	33.38	27.19	0.5	119
engagesum	347	3.92	2.24	1	8
ses	305	0.40	0.34	0	1
freelunch	208	0.25	0.44	0	1
private	301	0.14	0.35	0	1
owninstrument	216	0.64	0.48	0	1
plansum	305	0.61	0.49	0	1
totalsetting	289	37.38	14.74	1	70
totalalignment	274	3.85	0.90	1	5
learnlearn	277	2.02	1.55	0	7
locus	300	4.15	0.79	1	5
musicmulti	311	4.04	2.78	0	5
yearsplaying	309	5.34	4.15	0.08	18
age	254	16.56	1.34	13	21
male	285	0.54	0.50	0	1
grades	301	4.18	0.77	1	5
black	272	0.35	0.48	0	1
white	282	0.20	0.40	0	1
hispanic	281	0.12	0.32	0	1
asian	272	0.03	0.16	0	1
multirace	282	0.28	0.45	0	1
otherrace	272	0.04	0.21	0	1
english	283	0.77	0.42	0	1
usborn	281	0.67	0.47	0	1
g9	282	0.22	0.41	0	1
g10	282	0.24	0.43	0	1
g11	282	0.27	0.45	0	1
_g12	282	0.24	0.43	0	1

On average, students in the sample had been playing their instrument just over five years. This distribution is positively skewed and dispersed, with a large standard deviation—just over four years. Students spent an average time of 33 hours per week engaged with music. This engagement included practicing and performing, but also listening to music. In this case as well,

the distribution was positively skewed, with a median engagement time of approximately 29 hours. Of the students in the sample, 61 percent indicated that they intended to study music in some way in college, planned to pursue music professionally, or both. Excluding singers, 64 percent of students indicated they owned their principal instruments. Of the total sample, 71 percent of students' parents or guardians owned their own homes. Twenty-five percent of students received free or reduced-price lunch in school, and of the total sample, 14 percent were enrolled in private high schools, with the remainder attending public school. Student mean self-reported grades were in the B range, with a standard deviation of approximately one letter grade. Males made up 54 percent of the sample, and the average age was approximately 16.5 years old. Students who identified as Black or African American made up the largest racial category at 35 percent of the total sample. Twenty-six percent of students identified as Multiracial, 21 percent as non-Hispanic Whites, 12 percent as Hispanic, 2 percent as Asian, 2 percent as Native American, and 4 percent listed another race. Students were fairly evenly distributed across grade levels, with about a quarter of the sample in each high school grade nine through twelve. Of students in the sample, 14 percent live in a country other than the United States. This is because the Montgomery summer musicianship program attracts and enrolls students from other countries.

Table 3.2. Descriptive Statistics for Research Sites

Variable	Montgomery	Miles	Newton	Thoreau
performance	6.11	6.05	4.78	4.59
theory	5.76	6.19	4.80	4.16
time total	54.53	31.53	12.40	14.97
engagesum	4.58	4.38	2.75	3.04
ses	0.72	0.29	0.19	0.19
freelunch	0.72	0.04	0.08	0.09
private	0.40	NA	NA	NA
owninstrument	0.94	0.86	0.25	0.34
plansum	0.89	0.50	0.37	0.41
totalsetting	42.88	38.70	31.20	30.63
totalalignment	3.99	4.10	3.64	3.43
learnlearn	3.10	2.09	0.96	0.97
locus	4.44	4.28	3.83	3.73
musicmulti	5.00	4.70	2.33	3.04
yearsplaying	4.32	4.49	2.70	2.85
age	16.74	16.18	16.31	16.85
male	0.74	0.35	0.44	0.44
grades	4.32	4.39	3.97	3.89
black	0.16	0.30	0.61	0.52
white	0.42	0.13	0.02	0.04
hispanic	0.19	0.06	0.05	0.10
asian	0.06	0.02	0.00	0.00
multirace	0.14	0.48	0.28	0.32
otherrace	0.05	0.02	0.05	0.07
english	0.69	0.87	0.78	0.82
usborn	0.56	0.85	0.61	0.73
g9	0.11	0.37	0.32	0.16
g10	0.20	0.16	0.35	0.31
g11	0.39	0.19	0.22	0.20
g12	0.25	0.29	0.12	0.33

I incorporated two music-focused and two non-music sites in this study. Both Wesleyan University's summer musicianship program and Miles Davis (a music and performing arts focused high school) attract students with music-rich backgrounds and articulated interests in music. Students attending the other two non-music-and-arts-focused high schools in this study may not necessarily or on average be as focused on music learning. By incorporating two music-

focused and two non-music-focused sites in this research I was able to examine the music learning networks of students who were likely to pursue music in college and/or professionally, as well as students who engaged in music more recreationally. Students attending Wes Montgomery had higher SES levels than the high school students as a whole. For example, 28 percent of students at Montgomery were eligible for free or reduced-priced lunch in high school, compared to 96 percent at Miles Davis, 92 percent at Newton, and 91 percent at Thoreau. Comparing the total time students reported engaging with music per week, we find greater engagement at Montgomery (an average of 54 hours per week) and Miles Davis (32 hours per week), than Newton (12 hours per week) or Thoreau (15 hours per week). Students enrolled at Montgomery or Miles Davis were also significantly more likely to indicate they intended to pursue music after high school than students at Newton or Thoreau—they also, on average, had been playing their instruments for longer.

All sites were relatively racially and ethnically diverse. At Wes Montgomery, the largest racial/ethnic group was White, making up 42 percent of the Montgomery sample. The largest racial/ethnic group at Miles Davis was Multiracial (48 percent of the within-school sample population). At Newton, Blacks made up 61 percent of the within-school sample; at Thoreau, Blacks made up 52 percent. Students in my samples were, for the most part, uniformly distributed across grade levels. The racial/ethnic composition of my samples and the proportions of students eligible for free/reduced-price lunch (in the case of the high school sites) closely resemble schoolwide data I acquired from the National Center for Education Statistics and from Montgomery administrators. This alignment between samples and school populations with regard to race/ethnicity and SES provides some evidence that my samples are, in some ways, representative of the schools from which they were drawn.

Figures 3.2 and 3.3 display, by school, the five most popular principal instruments students played and the five most frequently played genres of music. Students are able to identify only one principal instrument but may indicate that they play multiple styles of music.

Figure 3.2.

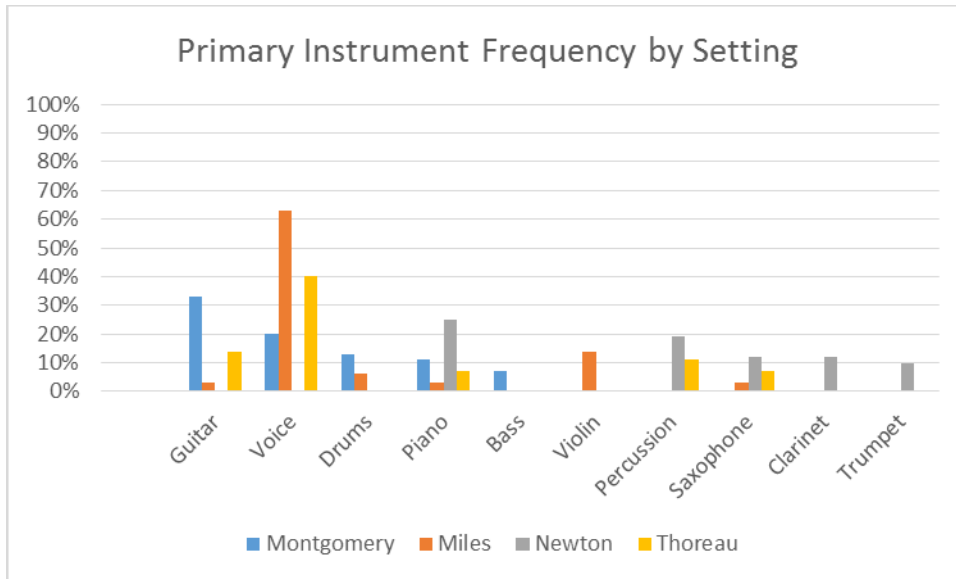
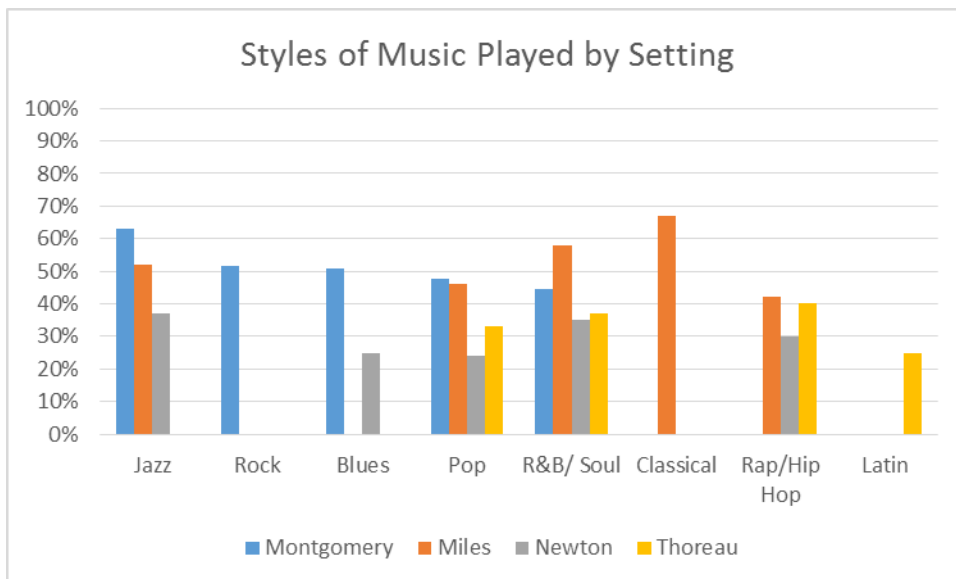


Figure 3.3.



Popular band instruments are prevalent at Montgomery: guitar, voice, drums, piano, and bass. Most students at Miles Davis sang. Jazz band instruments were more prevalent at Newton, and 40 percent of students at Thoreau sang.

Sample Size Considerations. Prior to the collection of data, I conducted a power analysis to determine an appropriate sample size. Using a multiple regression analysis approach, a type I error rate of .05, 10 predictors in the model, a moderate effect size of $f^2=.15$, and a desired statistical power level of .8, an estimated minimum sample size would be 118 students. All things being equal, this number represents a lower bound on minimum sample size as network analysis approaches can introduce dependencies where observations (students, in this case) are not independent of one another. The sample size of 347 allowed for more sensitive analyses and the possibility of subgroup or site-specific, as well as aggregate, analyses. Feasibility also played a role in limiting the sample size. While more sophisticated sampling approaches and larger sample size would hold the potential to increase the sensitivity and generalizability of findings, four sites and upwards of 400 student participants approached an upper bound of what could be accomplished given the time frame and available resources.

I will describe the institutions and the data collection procedures I used in each. I will describe all data collection instruments after providing information about the sites.

Wes Montgomery College of Music Summer Musicianship Program.

Wes Montgomery College of Music is an elite music-focused institution of higher education that emphasizes teaching and learning in contemporary forms of music. The campus is located in the center of the large city in the northeastern United States (I hereafter refer to this city as Appleton) where I conducted my research. The college awards bachelor's and master's degrees in various music-related fields and also runs multiple summer music education

programs. I selected a large summer musicianship program run by the college as a research site. One thousand six hundred and twenty-six students participated in the program in 2013. This program is very diverse and draws students from all over the United States and the world. The summer musicianship program is an elective, intensive, music-focused educational experience that attracts students—primarily high school juniors or seniors—who are interested in music. All students play an instrument or sing. Students must register for the program, pay tuition (or receive scholarship funding), and most reside on campus at Wes Montgomery in Appleton for the entire course, which runs for five weeks during the summer. Students in the program take classes in music theory and ear training and play or sing in ensembles. The course load is intensive and resembles that of an incoming freshman at Wes Montgomery College. My sample is similar to the program population with regard to race/ethnicity and is by some measures more diverse. I made a specific effort during data collection to oversample racial/ethnic minority students.

A relatively low percentage of the population was eligible for free/reduced-price lunch—11 percent. The five most played instruments were guitar, voice, drums, piano, and bass. The five musical genres students most frequently reported playing were jazz, rock, blues, pop, and R&B/soul. On average, students reported playing five musical styles.

The college also operates an educational nonprofit program—I will refer to the nonprofit here as the Urban Academy—to provide music education to primary and secondary school students from underserved communities in Appleton and from multiple other locations in the United States. This group was more racially/ethnically diverse than the program population as a whole. In 2013 this college-affiliated nonprofit provided scholarships for 106 students—55 from Appleton and 51 from other parts of the country—to participate in the summer musicianship

program. The scholarship award process is competitive, and scholarships are typically awarded to students who have already been participating in some form of music activity with the Urban Academy. In addition to participating in the standard summer musicianship courses, recipients of the Urban Academy scholarship participate in additional courses designed to foster their academic skills and to help them transition to college.

All 1,626 students in the Wes Montgomery summer musicianship program were asked to participate in my study. Random assignment to participation was not possible, and I hoped for a census. I used multiple strategies to recruit participants. All parents and students received a flyer during program registration explaining the study and requesting student participation. Flyers contained a link to an online survey that students were asked to complete toward the end of the program. I used Qualtrics (2015) online survey software to conduct the survey. In addition, flyers containing a link to the survey were placed on campus. Finally, I personally addressed the entire student population assembled for a concert that participants in the program were expected to attend. I described the study and requested student participation. All students attending the concert were provided a participation form. Students who chose to participate in the research completed the form and provided their email addresses. As students left the auditorium, their forms were collected, and volunteers recruited additional participants by collecting email addresses of interested students. I then emailed the link to the online survey to students who chose to participate. During my pre-concert presentation, I also requested student participation in a focus group that will be described in more detail below. Students completed their surveys and some participated in focus groups at the end of their summer musicianship program. The reason for this timing is that the survey and focus groups asked students to provide some types of information they would acquire during the program itself.

One hundred fifty-three out of 1,626 summer musicianship students participated in the study—a response rate of 9 percent. I was provided the email contact information for the 106 students who were recipients of the Urban Academy scholarships—of those students, 56 participated, a within-group response rate of 53 percent.

Access to students in the summer musicianship program at Wes Montgomery College was limited, and surveys could not be completed during class time or assembly periods—a factor that likely contributed to a lower response rate. While the response rate limits inferences from this sample of students to the program population as a whole, student characteristics in my sample were similar to the program as a whole according to administrative data provided by Wes Montgomery. This means that my sample, while nonrandom and 9 percent of total participants, is in some concrete senses representative of the entire program population. My sample differs from the program population in that it includes greater proportions of racial/ethnic minority students. This is in large part a consequence of the higher within-group response rate achieved for the Urban Academy, which enrolled greater proportions of racial/ethnic minority students than Wes Montgomery as a whole in 2013.

The Urban Academy Appleton High Schools Outreach Program. The Urban Academy at Wes Montgomery also runs a music outreach program for public schools in Appleton. During the time this research was conducted, the Urban Academy was providing outreach services to four public high schools in Appleton. I approached all four public high schools and requested their participation in this study. Of those four, three high schools became research sites. For various scheduling and administrative reasons, it was not possible for the fourth school to participate.

Public schools either approached or were approached by the Urban Academy to become a partner institution. The outreach partnerships were formed for different reasons: a school music program was struggling, or school administrators proactively reached out to Wes Montgomery, or a school's need and the kinds of support Montgomery could offer aligned well. The Urban Academy's articulated purpose for forming university-school partnerships in Appleton is to provide music learning opportunities to students who would not otherwise have them, or at a higher level than they would have otherwise had them. Partner schools are supposed to receive multiple supports from the Urban Academy and engage in various assessment and professional development activities. Supports can include a faculty partner from the Urban Academy working with the public school, the implementation of Urban Academy developed curricula, and the implementation of professional development and assessment activities. The extent to which these articulated program goals are implemented (or whether they are implemented at all) varies greatly by public school partner. I did not focus my research on the nature of the partnership or the educational supports offered (implemented or not) by the Urban Academy. Choosing Urban Academy partnership schools functioned as a gateway into public schools in underserved communities. All of the schools in my study had some explicit commitment to music education—if not a fully developed well-resourced music programs—and served large proportions of low-income and racial/ethnic minority students.

Miles Davis High School. Miles Davis High is a performing and visual arts focused public high school located in downtown Appleton. In order to attend, students must be Appleton residents and be offered admission after successfully completing a competitive audition process. I estimate that the music concentration—one of multiple arts concentrations at Miles Davis—had 111 music students enrolled in the 2013-2014 academic year (I was unable to confirm this figure

with the school's administrative staff). Of these 111, 68 participated in my study—a response rate of 61 percent.

In this Title I school, 71 percent of the students in my sample and 74 percent of the school's population were from lower-income families and were eligible for free or reduced-price lunch. A majority of my sample and the schoolwide population were female—64 percent and 68 percent, respectively. Non-Hispanic Whites made up 13 percent of the study sample, 16 percent in Miles Davis. An unanticipated finding in Miles Davis and in all included high school sites is a significantly higher proportion of Multiracial students present in my sample than in the school population. I suspect this is a result of a difference in the way NCES and I collected and interpreted our data. I also included a racial category NCES does not, in which students can name a racial/ethnic group they self-identify with that is not among the other options in the survey. The five most played instruments in my sample of students—in order of popularity—are voice, violin, guitar, drums, and piano. The proportion of voice principals in my sample may be larger than what I would have found with a higher response rate—the largest class surveyed at Miles Davis was a choral class. The five most played styles of music—in order of greatest frequency—are classical, R&B/soul, jazz, pop, and rap/hip hop. At Miles Davis, and all high school sites, my target population was not the entire school but all students enrolled in any music course at the school during the time the study was conducted. I include descriptive statistics for the entire school because no high school that participated in this study was able to provide me with the administrative data I requested for their music classes. Students, on average, reported playing approximately five musical styles.

Towards the end of the school year, all Miles Davis music faculty members distributed flyers describing the study to their students. Interested students returned their signed

consent/assent and parental consent forms to the school. A colleague and I visited Appleton during one of the last weeks of school. We first met with all of the graduating music concentration seniors during a school assembly and again explained the study. We distributed a survey to interested students, who completed it during the assembly period. Afterwards we visited freshman, sophomore, and junior music concentrators in their classrooms. The study was explained, and interested students completed surveys in class. Additional blank copies of the survey were left with music department faculty members to distribute to students who were unable to complete their survey on the day of our visit. These additional surveys were collected at a later date.

At Miles Davis, and in all high school sites, surveys were paper and pencil and were completed in school with a researcher present. Paper and pencil surveys generated quite a bit of data entry work, but I could not be confident the requisite number of laptops and chargers and an Internet connection would be present on survey days to conduct the survey online. While approximately 95 percent of survey question items remained identical across sites, the fact that it was administered online in the summer musicianship program and in a paper and pencil format in the high schools meant that the survey became multimodal. This created a risk that the differing formats could lead to different responses and introduce bias. I tried to minimize this bias by ensuring that the question order and visual presentation on the paper surveys was virtually identical to the online version. I was fortunate because I was granted in-class time in all three high school sites for interested students to complete the survey. This resulted in response rates of approximately 80 percent in all three high schools—significantly higher than the 16 percent at Wes Montgomery.

I asked music teachers in all high school sites to complete student music evaluations. For logistical reasons teachers at Miles Davis were unable to complete these evaluations.

Newton Academy. The Newton Academy is a themed high school that emphasizes science, health, and math instruction. Newton Academy is located in a low-income, high-crime neighborhood of Appleton with high proportions of immigrant and racial and ethnic minority residents. Because of low performance across a range of metrics, including student grades and test scores, plans had been put forward at the district level to close the school several years prior to my study. Neighborhood protest contributed to the decision to keep the school open—it is still open but has new leadership.

The Newton Academy is a Title I school. Eighty-four percent of students in my sample and 67 percent of the school population are eligible for free or reduced-price lunch. Non-Hispanic Whites make up only 2 percent of the sample and overall school populations. Students schoolwide and in my sample are primarily Black, Hispanic, and Multiracial. The five most played instruments are voice (40 percent), guitar (14 percent), percussion (11 percent), piano (7 percent), and saxophone (7 percent). The most played musical genres—from most to least played—are jazz, R&B/soul, rap/hip hop, blues, and pop. Students, on average, reported playing approximately two musical styles.

In order to graduate from Newton Academy, all students must complete at least one course in music or art. One full-time music teacher taught all music classes in the school and was at times assisted by an adjunct faculty member from the Urban Academy. In May of 2014, the music teacher—Mr. Green—distributed study information forms and student assent/consent and parental consent forms to all of his students. The following week I visited all music classes held at Newton Academy. The class periods were dedicated to survey taking. I introduced the study

personally, collected consent and assent forms, and distributed the survey to students interested in participating. I remained in the classroom while students completed their surveys and answered questions. I collected all surveys and left blank copies with the music teacher for students who were not able to complete the survey that day, which I later collected. Sixty-nine out of 103 music students participated—a response rate of 67 percent. At Newton Academy, Mr. Green also completed brief student music evaluations for all consented students in the study. Unfortunately, these evaluations were almost identical for every student—and from what I could tell reflected a special evaluation philosophy (or lack of time to complete the evaluations) rather than a reflection of students’ learning in the course.

Thoreau High School. Thoreau High School is located in a diverse Appleton neighborhood. Household incomes are below the state average, although the neighborhood has experienced economic growth and is one of the more rapidly gentrifying neighborhoods of Appleton. Thoreau High School articulates a commitment to prepare students for postsecondary education but does not have specialized academic or vocational focus. Like the Newton Academy, Thoreau High had faced potential closure during the ten years prior to this study, due to poor performance on multiple metrics including student grades and test scores. The school remained open amid changes in leadership and high teacher turnover.

In this Title I high school, 87 percent of students are eligible for free or reduced-price lunch; 74 percent in the sample of music students were eligible. White students were the minority in the music sample and schoolwide, making up 4 percent and 3 percent of the populations, respectively. Blacks, Hispanics, and Multiracial students were the largest racial/ethnic groups. The most played instruments—in order of popularity—were voice (40 percent), guitar (14 percent), percussion (11 percent), piano (7 percent), and saxophone (7

percent). The most played musical styles were rap/hip hop, R&B/soul, blues, and pop. Students, on average, reported playing three musical styles.

All students at Thoreau are required to take a music or arts class in order to graduate. One full-time music teacher—Mr. Warren—and one part-time—Mr. Carter—were employed by the school. In May of 2014, Mr. Carter and Mr. Warren distributed study information flyers and student consent/assent and parental consent forms to students. Students were asked to read the information about the study and decide if they wanted to participate. If so, they would also seek written parental permission (for students under 18) and return the forms to their teacher. A week later a research assistant on this project visited the school (at the time I was conducting surveys at Newton Academy). The school and music teachers had set aside a class period for students to complete the survey. At the beginning of each class, the research assistant introduced the study and distributed it to interested students. She remained in the classroom while students completed their surveys and answered any questions. At the end of the day, she left blank surveys with the music teachers to be completed by students who for whatever reason were unable to complete the survey that day. I later collected these. Of the 85 students enrolled in a music course during the 2013-2014 academic year, 57 participated in the study—a response rate of 67 percent. Mr. Warren, who personally interacted with all music students at the school, completed student music evaluations for all consented students in the study. These evaluations contained sensible variation and appeared to have been thoughtfully completed.

Table 3.3. Summary of Data Collected by Research Site

	Settings			
	Montgomery Summer Musicianship Program	Miles Davis High School	Newton Academy	Thoreau High School
Data Collected	Survey & Two Focus Groups	Survey	Survey	Survey
Participants	153/1626	68/111	93/103	57/85
Survey Response Rate	9%	61%	67%	67%
Outcome Data Types	Self-Assessment (Peer Assessment Test Score)	Self-Assessment (Peer Assessment)	Self-Assessment (Peer Assessment)	Self-Assessment (Peer Assessment Teacher Assessment)
Focus Groups	I. N=7 non-Urban Academy II. N=4 Urban Academy	NA	NA	NA
Date Collected	July 2013	May 2014	May 2014	May 2014

Quantitative Survey Development

I developed the survey that I distributed to students in the four sites (See Appendix A). I drew upon extant surveys in music education, national music education assessment frameworks, education measurement and assessment literatures (including music and art focused assessment literature), sought feedback from professional musicians and music educators, and conducted a survey pilot prior to implementation. The National Assessment of Educational Progress (NAEP) 2008 student and school surveys informed the creation of my survey instrument. Variables from the NAEP 2008 student and school surveys are included here in Appendix H.

The shifting national climate towards performance-based accountability in U.S. public schools in the past decades and an increased emphasis on standardized testing have stimulated the establishment of standards and measures for music and arts learning (Seidel et al., 2009). The passage of the Goals 2000: Educate America Act of 1994 established music and the arts as a fundamental academic subject and stimulated the development of national standards—a process undertaken by the Music Educators National Conference (now the National Association for

Music Education [NAfME]) from June 1992 to June 1994 (National Association for Music Education, 2012). Nine standards were generated, on the core principles that music learners should be able to create, perform, listen to, and analyze music. These standards and principles were developed concomitantly with and influenced the creation of NAEP music assessments (U.S. Department of Education, 2008). The NAfME standards and National Assessment Frameworks are included as Appendices E, F, and G. Independent scholarship related to music assessment has also converged to an apparently large degree on the four music learning principles articulated in the national standards (Winner, 1992; Eisner, 2002; Arts PROPEL, 1992). I used NAEP Music Learning Assessment (Institute of Education Sciences, 2008), the U.S. Department of Education National Assessment Governing Board Arts Education Assessment Frameworks, and the NAfME music education standards as I developed the survey. I included survey items that would capture the creating, performing, and responding music learning objectives outlined by the National Assessment Governing Board, and adapted question items from NAEP for use in my survey.

While developing the survey, I sought the guidance of professional musicians and music education professionals. These collaborators, with complementary expertise in music and music learning, made suggestions regarding survey content. They shared their input related to music learning outcomes they believed to be significant—what was worth learning—and which factors were likely to influence these outcomes. My collaborators also provided input about the relevance, clarity, and difficulty of the questions on the survey. When a draft survey was completed, I conducted a pilot of the survey with an amateur community chorus in Appleton. Volunteer chorus members completed the survey, and some provided feedback on their survey-taking experience. This feedback included what survey takers were thinking when they read

particular questions and whether there were any survey questions that were unclear (a process referred to as cognitive interviewing), and specific suggestions for improvement. I revised my survey based on this pilot.

Variable Construction and Definitions. In the survey I define multiple constructs—both outcomes and predictors—and create multiple survey items to measure each construct. Using multiple question items to generate information about an underlying construct may result in a more accurate portrayal of the construct you want to learn about (Brennan, 2006). I make use of a nested approach using three (in one case, two) items to measure sub-constructs, which I can then aggregate to form meta-constructs. I evaluate Cronbach's alpha for all scales and subscales.

Using principal components analysis, I observed that sub-questions constituting each meta-construct formed separate components with eigenvalues above 1. Performance related sub-questions were part of the first component, and theory-related sub-questions were part of the second. Loadings for each component (and each question) were orthogonal, indicating that the performance and theory meta-constructs represented distinct music learning outcomes. An exception to this was music theory: whether a student indicated she could play a song by ear was aligned with performance ability, and whether she indicated she could identify chords and intervals and transcribe melodies aligned with the music theory component. For these analyses I included all ear training sub-questions in the music theory meta-construct for simplicity of interpretation. I believe creativity is conceptually distinct from theory and performance, and as a result I did not include it in either meta-construct.

Dependent Variables—Self Reported. I use four primary outcome variables in this analysis (all variables used in this analysis are summarized in a codebook included as Appendix

B). First, students provide self-assessments of their performance ability on their principal instrument. Second, students assess their own music theory knowledge. Third, students rate the overall helpfulness of the music learning settings in which they engage in helping them to achieve their musical goals. Fourth is a measure of participation in music learning environments. I will name, define, and describe the construction of each variable below.

Performance: A continuous self-reported measure of student performance ability on his/her primary instrument. I created this construct by averaging seven individual performance-related question items that also used a Likert-like scale ranging from 1 to 10 in which 1 indicated novice level and 10 indicated expert level. On those seven responses, students indicated their ability in the following areas: 1) performing for an audience, 2) technical proficiency on their instrument, 3) presenting themselves onstage, 4) composing and/or songwriting, 5) improvising, 6) interpreting the music of others, and 7) playing a song on their instrument by ear. The Cronbach's alpha for the performance construct is .88. Performance is normally distributed, with a mean of 5.5 and a standard deviation of 2.1.

Theory: A continuous self-reported measure of a student's music theory knowledge. This construct is also measured on a scale ranging from 1 to 10 in which 1 represents a novice level and 10 represents an expert level. I formed this construct by averaging student responses on seven music theory related assessment items. The individual items were measured on a Likert scale ranging from 1 to 10 (1=novice, 10=expert) and included the following items: 1) a student's ability to transcribe a melody he/she heard, 2) identifying chords or intervals after hearing them, 3) reading standard music notation, 4) writing using standard music notation, 5) knowledge of music theory, 6) critiquing music, and 7) communicating knowledge about music

to others. Cronbach's alpha for the theory construct is .91. *Theory* is normally distributed with a mean of 5.4 and a standard deviation of 2.1

Teacher Assessments, Peer Assessments, and Test Scores. I was unable to gather teacher assessments or test scores from all research sites. I received usable teacher assessments—which were identical to student self-assessments except completed by the teacher—in one high school, and student musicianship test scores from Wes Montgomery. I received peer assessment data for only some of the students in the sample. In order for me to receive these data, a participant would need to have been nominated by a peer who also provided assessment data, and this was not always the case. Given my sample size and research questions, it was infeasible to conduct subgroup analyses using the external assessment data I did have. However, to probe the validity of my self-reported performance and theory constructs, I correlated them with the external assessment data I did have. I found, based on a sample of 84 students, that the Montgomery musicianship test—designed primarily to evaluate music theory related knowledge—highly correlated with my theory construct, with a correlation coefficient of .45 ($p < .001$). Based on a sample of 54 students at Thoreau High School—using a single summary measure of student musical ability (an average of theory and performance constructs)—I found a significant and positive correlation between student and teacher assessments. The correlation coefficient is .30 ($p < .05$). Also using the single summary measure of student musical ability, and a subsample of 150 students for whom I had data, I found a statistically significant and positive correlation between self and peer assessments: a correlation coefficient of .30 ($p < .001$). The statistically significant and positive correlations between self-reported and teacher (or peer) reports of student musical ability are evidence in support of the validity of the theory and performance constructs I created.

Participation: Seven dichotomous indicator variables representing participation (or not) in each of the seven music learning environments included in this survey: school, informal, home, extracurricular, private lessons, online, and religious. 1=a student did participate in a setting; 0=a student did not participate in a setting.

Helpfulness: Seven ordinal variables measured on a Likert scale ranging from 1 to 5. For every music learning setting incorporated in the survey (school, informal, home, extracurricular, private lessons, online, and religious), students indicate their degree of agreement with the statement: “The following setting has been helpful to me in achieving my musical goals.” 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree. Distributions for these variables are negatively skewed, suggesting the possibility of a ceiling effect. These outcomes are used in conjunction with ordered probit models for which the normality assumption concerns an underlying latent distribution, not the observed data themselves. Further, I confirmed my regression models were robust to different groupings of the outcome variable: for example, 1=strongly disagree or disagree, 2=neither disagree nor agree, 3=agree or strongly agree.

Site-Focused Independent Variables.

Alignment: Seven polychotomous variables—one for each music learning setting—representing the degree to which a student feels the music he/she cares about most is valued and represented in an educational setting. The variable is measured on a scale of 1 to 5, indicating a student’s level of agreement with a statement that the music most important to him/her is highly valued, where 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

Time spent: Seven polychotomous variables—one for each music learning setting—representing the average number of hours per week a student engages with music in a particular setting. Zero represents no engagement, 1=<1 hour, 2=1-2 hours, 3=2-4 hours, 4=4-8 hours, 5=8-16 hours, and 6= >16 hours

Learned: Seven polychotomous variables—one for each music learning setting—indicating how many music skills (out of a total possible of seven) a student reported learning in a particular environment.

Supported: Seven polychotomous variables—one for each learning setting—representing a student's level of agreement with the statement that he/she feels his/her music learning is strongly supported, where 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

Resources: Seven polychotomous variables—one for each learning setting—representing a student's level of agreement with the statement that he/she feel the resources he/she needs are present in an environment where he/she engages musically, where 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, and 5=strongly agree.

Quality: Seven continuous variables—one for each learning setting—representing a student's perception of the overall quality of a music learning environment. The variable is constructed by averaging a student's responses for the following five variables: resources, alignment, enjoyment, helpfulness, support.

Student-Focused, Social Network Related, Independent Variables.

Indeg: A continuous measure of a student's indegree. *Indegree* is a term in social network analysis that means—in this case—the number of peers who nominated the student as

helpful to their music learning. For example, if four students nominated student A as helpful to their music learning, student A's indegree value would be four.

Outdeg: A continuous measure of a student's outdegree. *Outdegree* is a term in social network analysis that means—in this case—the number of peers a student has nominated as helpful in his/her music learning.

Ineigen: A continuous measure of a student's centrality in his/her site's music learning network that is based on the left eigenvector of an unsymmetrized matrix. Higher values correspond to greater centrality.

Outeigen: A continuous measure of a student's centrality in his/her site's music learning network that is based on the right eigenvector of an unsymmetrized matrix. Higher values correspond to greater centrality.

Betweenness: A continuous measure of network centrality equal to the number of shortest paths between all vertices that pass through a node.

Additional Student-Level Independent Variables.

Totalsetting: A continuous variable representing the quantity and quality of the music learning environments a student engages in. The variable is created by summing the values of the *quality* variables for all settings in which a student participated.

Totalsetting2: A continuous variable representing the quantity and quality of the music learning environments a student engages in. The variable is created in a manner identical to *totalsetting*, except that the *alignment* variable is not used.

Totalalignment: A continuous variable representing the average level of alignment experienced by a student in the settings in which she participates.

Musicmulti: A continuous variable representing the total number of musical styles a student reports playing on an instrument or singing. The minimum value is 0 and the maximum is 15.

Locus: A continuous variable indicating a student's level of locus of control—a construct representing the degree to which individuals believe they can control events affecting them (Rotter, 1990). This construct was created by averaging student responses on five individual question items. The Cronbach's alpha for this construct is .88.

Instrument: Multiple dichotomous variables indicating which instrument a student plays. Students who play multiple instruments chose a single instrument they feel is their primary instrument. 1 indicates a student plays the instrument, and 0 indicates they do not.

Lntimetotal: A continuous variable indicating the natural log of the number of hours per week, on average, a student spends engaging with music by him/herself or with others. Engagement can include listening to music, playing or practicing an instrument, performing, and composing/songwriting. The untransformed time-total was positively skewed and taking the natural log normalized the data—the mean is 3.1 hours with a standard deviation of 1.

Lnmonthsplaying: A continuous indicator variable that is the natural log of the total number of months a student indicates he/she has been playing the primary instrument.

Planpro: A dichotomous indicator variable representing whether or not a student plans on becoming a professional musician: 1= yes, 0=no or maybe.

Plancollege: A polychotomous indicator variable representing a student's intent to study and engage in music in college: 3=yes, 2=maybe, 1=no.

Plancollege1: A dichotomous indicator variable representing a student's intent to study and engage in music in college: 1=yes, 0=no.

Plansum: A dichotomous indicator variable representing a student's overall musical aspirations. 1 indicates that a student plans to study music in college, or become a professional musician, or both; 0 indicates that a student does not intend to be a professional musician or engage in music in college or is unsure.

SES: A continuous variable representing a student's socioeconomic status created by averaging five dichotomous indicator variables:

1) *owninstrument*: Student owns primary instrument: 1=yes, 0=no.

2) *ownhome*: Student's guardian(s) own home: 1=yes, 0=no.

3) *momed*: Student's mother or figure most like a mother is a college graduate: 1=yes, 0=no.

4) *daded*: Student's father or figure most like a father is a college graduate: 1=yes, 0=no.

5) *freelunch*: Student is eligible for free/reduced-price lunch in school: 1=no, 0=yes. The coding pattern differs in this case so that for each variable in the SES construct, 1 indicates higher-SES and 0 indicates lower-SES.

Six mutually exclusive indicator variables represent a student's race. For each variable, the number 1 indicates that a student self-identifies with a racial/ethnic category and 0 indicates she or he does not. The race/ethnicity indicator variables are: *black*, *white*, *hispanic*, *asian*, *multirace*, and *otherrace*. No students in my sample self-identified exclusively as Native American or Hawaiian/ Pacific Islander. *Multiracial* in my sample means indicates students who self-identified with more than one racial/ethnic category. Students were also able to list a racial/ethnic category with they identified that was not listed on the survey—12 students did so and are represented by the variable *otherrace*.

english: Dichotomous indicator variable showing whether a student is most comfortable with English as opposed to another language: 1=yes, 0=no.

uslive: Dichotomous indicator variable representing a student's country of primary residence: 1=United States, 0=other country.

usborn: Dichotomous indicator variable representing student's country of birth: 1=United States, 0=other country.

Four indicator variables represent the school or program in which a student participant was enrolled at the time of data collection. For each variable, 1 indicates a student was enrolled at a site; 0 indicates a student was not enrolled. The site indicator variable names are *montgomery*, *miles*, *newton*, and *thoreau*.

grades: A polychotomous variable representing a students' self-reported grades, on average, in high school during the year in which they completed the survey: 5=mostly A's, 4=mostly B's, 3=mostly C's, 2=mostly D's, 1=mostly F's.

age: A continuous variable representing a student's age in years.

male: A dichotomous indicator variable representing a student's gender: 1=male, 0=female.

g9, *g10*, *g11*, *g12*: Four dichotomous indicator variables representing the grade in which a student was enrolled during the academic year in which the survey was conducted: 1=the student was enrolled in the grade indicated, 0=he/she was not.

Additional Social Network Variables and Data Collection Procedures. Students included their name on the surveys and nominated up to five peers who also attended their school (whether or not they were enrolled in the music program) who they felt were most helpful to their music learning. I used a name generator approach to network sampling for two reasons: 1) I

did not have access to student names or class lists at my research sites; 2) even if I did have access, using a roster approach and asking students to choose supporters from a list of up to 1,600+ names was not workable. In all sites, for all supporters nominated, survey takers provided the following additional information:

alterrank: Rank of relationship in terms of overall importance to music learning (5=most important, 4=second most important, and so on).

alterability: A continuous variable representing the student's evaluation of their peer's overall music ability on a Likert-like scale ranging from 1 to 10, where 1=noVICE and 10=expert.

altertime: A categorical variable representing the hours per week, on average, the student spends with the supporter (from less than 1 hour to more than 16 hours). 0 represents no engagement, 1=<1 hour, 2=1-2 hours, 3=2-4 hours, 4=4-8 hours, 5=8-16 hours, and 6=>16 hours.

alterschool: A dichotomous variable indicating whether they interacted with their supporter primarily inside school (1=yes, 0=no).

alterfriend: Dichotomous variable indicating whether the student considered the supporter a friend (1=yes, 0=no).

I did not identify validated measures in the literature for many of the music learning outcomes I was interested in. This required that I create some form of measurement for these constructs.

Qualitative Component

I conducted two focus groups with students enrolled in the Wes Montgomery summer musicianship program. The first focus group consisted of seven students who were not participants in the Urban Academy scholarship program. The second focus group consisted of

four students who were recipients of the Urban Academy summer performance program scholarship. While the structure of the focus group was very similar for both groups, I scheduled a separate focus group specifically for Urban Academy students to maximize the chances they would participate.

At the group level—Urban Academy or non-Urban Academy—the sampling was purposive, with a goal of achieving representation from both groups. Within-group sampling took place in several ways. For the non-Urban Academy focus group, all summer musicianship students were invited, and were again reminded of the focus group on the day I described the survey to students. On the day of the focus group, a research assistant also randomly approached students prior to the focus group and again extended the invitation to participate. This combined strategy opened the possibility for participation to the widest range of students, and random additional requests by the research assistant likely brought in students who would not have otherwise self-selected into participation.

Urban Academy students were not excluded from the first group, but none attended. I arranged the Urban Academy focus group with a college administrator, who nominated Urban Academy scholarship students for participation. This additional focus group was created to reach an otherwise hard-to-reach group. The administrator focused her nominations among interested students who represented the range of students served by her program. Wes Montgomery summer musicianship students participating in this program often were from underserved communities, and their voices and ideas are central to this inquiry. While I had hoped to conduct participant interviews with select students in high school sites, time and resource restrictions made this infeasible for this study—this additional work can be pursued in future research.

The purpose of the focus groups was to elicit detailed student descriptions and perceptions regarding the supports and barriers to their music learning, with a particular emphasis on the people, places, and resources students perceive to be most helpful to them. I asked students to talk about how and why particular people, places, and resources helped them to achieve their musical goals. Participants described the initial development of their musical interests and the supports they received at that time in their musical development. Students talked to me about what they felt to be their own role in the learning process. I talked with participants about their musical goals and dreams, and asked if they felt that the kinds of musical participation most important to them were valued, recognized, and respected in and across the settings in which they engaged musically. Students described barriers they felt limited their access to or participation in music in various settings. In addition, I asked students what suggestions they would offer—both to younger musicians beginning their musical journeys and to adults who are supporting them—that they felt might improve learning opportunities and outcomes for the next generation.

A key benefit of the qualitative component of the design is that it offers a window through which to view the functioning and development of a music learning network over time. It provides a longitudinal dimension to a largely cross-sectional study. Student descriptions and perceptions help to convey the meaning of a music learning network to students. The qualitative data dovetail with the social network and survey data in the sense that they provide descriptions illuminating why and how the connections we observe in the quantitative data are forming, dissolving, or not forming at all. And an equally important reason is that student voices, perceptions, and feelings are axiomatically important and should feature centrally in education research.

I developed one semi-structured focus group protocol to use with both focus groups (see Appendix C). The semi-structured format served to ensure common questions were asked of both groups, but also provided flexibility for students to contribute information that they feel to be important but may fall outside the range of interview protocol questions. The focus groups lasted between one and a half and two hours. Each was held in a classroom at Wes Montgomery, offering a familiar setting to which students had easy access. Both sessions were recorded with a digital audio recorder and transcribed using a word processing program.

Participants and Demographics. The table below summarizes some of the demographic characteristics of focus group participants. Pseudonyms are assigned to all participants to protect their privacy

Table 3.4.

Focus Group Participant Demographic Information				
Focus Group I: Non-Urban Academy				
Pseudonym	Country of Residence	Ed. Level	Instrument	Race/Ethnicity
<i>Maria</i>	Mexico	Post HS	Guitar, Voice	Latina
<i>Adam</i>	U.S.	HS	Voice	White
<i>Marcelo</i>	Brazil	HS	Guitar	Latino
<i>Makana</i>	U.S. (Hawaii)	HS	Violin	White
<i>Howard</i>	U.S.	College	Guitar	White
<i>Mike</i>	U.S.	HS	Saxophone	White
<i>Jose</i>	Mexico	Post HS	Guitar, Voice	Latino
Focus Group II: Urban Academy				
Pseudonym	Country of Residence	Ed. Level	Instrument	Race/Ethnicity
<i>James</i>	U.S. (Oakland, CA)	HS	Drums	Black
<i>Leonard</i>	U.S. (Phoenix, AZ)	HS	Piano	Black
<i>Alex</i>	U.S. (Israeli born)	HS	Drums	White
<i>Joe</i>	U.S.	HS	Piano	Black

The non-Urban Academy group consisted of three international students and four U.S. students. All U.S. students were White. One female student—Maria from Mexico—participated. Four of the seven participants played guitar, though saxophone, violin, and voice were represented as well. Four students were high school-aged, and three were older (including one student who attended the focus group who was a matriculated college student at Wes Montgomery). Inclusion criteria were more flexible for focus group participants than for surveys. While the original intention was to recruit only participants currently enrolled in the summer musicianship program—or just graduated from high school—three participants did not fit these criteria. Of those three, two were older summer performance program participants and one was a matriculated Wes Montgomery college student. I felt these additional voices and perspectives would add to the inquiry and decided to include them. Four students participated in the Urban Academy focus group. All were male, high school-aged and residents of the U.S.—three born in the United States, and one born in Israel. Three participants were Black and one was White. Two students played the drums and two played the piano.

Qualitative Data Analysis. I used a mixed approach during data analysis in which I applied codes and categories that originated from my ecologically influenced music learning network framework, and allowed additional codes to emerge organically from the data themselves. A complete codebook is attached as Appendix D. Through the application of mutually exclusive and exhaustive codes—both etic and emic (Lett, 1990)—I integrated and grouped data from both focus groups into “bins” for further analysis. Etic codes are structured by the researcher a priori and are often linked to a theoretical framework, while emic codes emerge naturally from the data themselves (Lett, 1990).

When using an etic—or emergent—coding strategy, I followed a multi-step approach. First, I read, reread, and considered the focus group transcripts—giving thought to their meaning. Second, I worked through my data systematically—sentence by sentence. After each sentence, I made a very brief note that essentialized its meaning. This process is referred to by some scholars as open coding (Merriam, 2009). Third, I aggregated multiple open codes into more general and encompassing concepts, a process referred to as axial or analytical coding (Merriam, 2009). I arrived at approximately 60 subcodes, which I then aggregated up to 9 primary codes. The 9 primary codes are as follows: people; places; resources; supporter strategies; learner strategies; alignment and misalignment; learning network; recognition and respect; and challenges. Taken together, these three steps are analogous to what Erikson (1986) terms analytic induction, and what Miles and Huberman (1994) refer to as moving up the “ladder of abstraction.” I independently considered the relation and applicability of all codes and subcodes (and the concepts they represented) for each research question in this analysis. This application led to the creation of high-level assertions, relations, and patterns that functioned as partial answers to my research questions. Erikson (2011) describes the end result this way:

Through analytic induction, [one wants to discover] a few general assertions—pattern statements with a wide enough reach that they connect by threads, as it were, to sub-assertions, which ultimately are connected by threads to data bits across multiple sources in the total corpus of information sources. The most satisfactory analysis is one in which, by pulling a few threads at the top node of a set of sets of connected threads, more discrete bits of data are tugged on within the whole corpus of information sources than would have been by any other top-level nodes of threads (i.e., by alternate lines of interpretation and analysis). (p. 1462)

I looked across the qualitative findings for each of my research questions to discern overarching frameworks, models, or possible generalizations to theory. This theory building (and data analysis), insofar as emergent codes were involved, is akin to a grounded theory approach (Charmaz, 2006). The process followed here differs from some scholars' interpretation of grounded theory in that emerging theoretical constructs did not influence the data collection process—primarily because I met with participants in each focus group only once.

Data Analytic Plan by Research Question

Research Question 1: What are the most helpful relationships, settings, and resources that constitute a music learning network? I explore my quantitative data and present descriptive statistics for the entire sample and by site. I conduct multiple social network analyses for each school. I analyze my qualitative data and draw connections to quantitative findings.

Research Question 2: Do students with rich connections to people, settings, and resources in a music learning network exhibit more positive learning outcomes on average than those without these connections? If so, which relationships, settings, and resources are most strongly associated with higher levels of music learning? I fit two taxonomies of regression models—one predicting music theory and the other predicting music performance abilities. Key question predictors in both sets of models include social network indices, the quality and quantity of settings students engage in, and SES. I also include covariates for race/ethnicity and research sites. The regression models are of the form:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \varepsilon$$

I also conduct multiple qualitative analyses and integrate these with findings from my regression models.

Research Question 3: Do students whose interests, motivations, and goals are aligned with the resources available to them in their learning network exhibit more positive music learning outcomes than students whose interests and motivations are not in alignment with resources available to them? Qualitative analyses are primary, and I advance a model of alignment based on qualitative findings. I fit seven ordered probit models predicting the overall helpfulness of a setting to a student’s musical goals. The primary question predictor in all models is a variable representing the degree of alignment between a student’s musical interests and the settings in which they engage. The ordered probit models are specified:

$$\Pr(y_i = j) = \Pr(\tau_{\{j-1\}} < y_{i*} \leq \tau_i)$$

where:

$$y_{i*} \sim \text{Normal}(\mu_i, 1)$$

and

$$\mu_i = \beta_0 + \beta_1 * x_{\{1i\}} + \beta_2 * x_{\{2i\}} + \dots$$

I also add alignment predictors to final regression models for music theory and performance abilities fit for Research Question 3. Those standard multiple regression models are specified as indicated in Research Question 3.

Research Question 4: Are the music learning networks and music learning outcomes of low-SES students different on average from those of high-SES students, and if so, in what ways? I disaggregate data for setting participation, quality, and instrument ownership by SES, calculate mean values by low-SES and high-SES groups, and conduct t tests to determine whether observed differences are statistically significant. I fit logistic regression models to predict the likelihood of participation in each of the eight music learning settings explored in this inquiry. Socioeconomic status (SES) is a key question predictor in these models.

The logistic regressions are of standard form and are specified:

$$\text{Prob } [Y = 1] = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n)}}$$

I analyze my focus groups data, and pay particular attention to differences in participant responses from the Urban Academy and non-Urban Academy groups. I present these findings and integrate them with results from the quantitative work.

Limitations

I will adapt a validity typology developed by Shadish, Cook, and Campbell (2002), to organize my discussion of the limitations of this study. Table 3.5 below lists the four adapted dimensions of their typology and provides a definition of each.

Table 3.5. Validity Typology

Statistical Conclusion Validity: The validity of inferences about the correlation (covariation) between outcome and predictor variables.

Internal Validity: The validity of inferences about whether observed covariation between A (a predictor) and B (the outcome) reflects a causal relationship from A to B as those variables were manipulated or measured.

Construct Validity: The validity of inferences about the higher order constructs that represent sampling particulars.

External Validity: The validity of inferences about whether the relationship observed in the sample holds over variation in persons, settings, outcome variables, and predictor variables.

Adapted from Shadish, Cook, and Campbell (2002), p. 38.

Statistical Conclusion Validity. A limitation of my study has to do with missing data. Participants did not always complete their surveys, and I did not always achieve the survey response rates I had hoped for. At times it appeared students made a deliberate decision not to

answer particular questions; at other times it seemed students completed a portion of the survey and then stopped before finishing it. Occasionally, surveys were returned with questions primarily unanswered, and I doubted whether the responses that were on these surveys were meaningful. Nonrandom missing data can bias results. I worked to address these limitations in multiple ways. I dropped surveys that contained excessively missing data (≥ 60 percent) and responses that seemed unreliable—approximately 18 percent of the total surveys. When possible, I used maximum likelihood missing value (MLMV) estimators using Stata 12 statistical software (2011) when fitting multivariate statistical models with missing data. MLMV estimators make use of all available data when fitting models, minimizing bias, and produce results that are almost identical to models fit using multiple imputed datasets. In some cases I fit models using a listwise deletion procedure. I tried to do this only in instances where MLMV was infeasible and the number of cases lost due to listwise deletion was minimal. As I develop this work, I will explore the use of MLMV estimators for logistic and ordered probit regressions.

An additional potential problem is the risk of type II error: failing to detect a statistically significant relationship between two variables when there is one—or reporting a false negative. I attempted to minimize this risk by maximizing my sample size and choosing an appropriate modeling strategy. However, if the relationships between predictor and outcome variables are present but weak, I might have detected them only with a sample size that was larger than the 347 I had. There is also a risk of type I error—detecting a statistically significant relationship between predictor and outcome when none exists (or a false positive). I worked to minimize this possibility by conducting multiple statistical analyses related to the same substantive question, triangulating, and integrating qualitative data to inform conclusions.

Missing data also pose risks to the validity of statistical analyses of social networks. I acknowledge this limitation in my data and try to target in-depth statistical analyses of social networks in sites where I have the highest response rates.

Internal Validity. A clear limitation of this research is that causal inference is not supported based on the data I have collected and the analyses I have conducted. We cannot know whether the statistically significant predictors in the models in this inquiry caused the outcomes we observed. Whether the observed relationships in this study are causal are hypotheses that can be investigated with future experimental or quasi-experimental research. Qualitative data that corroborate quantitative findings in this inquiry may lend support to the possibility of a causal relationship between predictor and outcome, but additional research is needed to substantiate any causal claims.

Construct Validity. Learning involves change over time. In this analysis I use a cross-sectional measure of music performance and music theory ability as a proxy for learning, primarily for the reason that it was not feasible (given time and resources) to gather multiple waves of data. It is not entirely possible, given my design, to entirely exclude the possibility that some of what is measured by my music performance and theory constructs is innate ability and not learning. However, I argue that the constructs do represent learning for two key reasons—one philosophical and the other methodological. On the philosophical side, ability in music does require learning. Innate ability (if such a thing exists in music) may potentiate learning but is not a substitute for it. Mozart and Beethoven studied and so do adolescents today. On the methodological side of the matter, students in my high school sites reported how much they felt they learned during the course of the year. In one high school (Thoreau), a teacher also evaluated student learning. In this school, the teacher's assessment and students' self-assessments of

learning were positively correlated, and the relationship was statistically significant. I did not incorporate learning self-assessments at Wes Montgomery due to the brief nature of the program.

An additional question is whether the measures of music theory and music performance are valid representations of those abilities. To maximize the chances that they would be, I included multiple question items for each sub-construct. I also obtained Cronbach's alpha measures for all constructs and ensured they were above the .8 threshold used by some in the educational measurement world as a strong indication of measurement validity. That said, my survey instrument did not undergo all of the possible phases of development that can be used to establish the validity and reliability of a psychometric instrument. This is a limitation and an opportunity for future research.

Finally, in this study I rely primarily on student self-reports. Due to site restrictions I was able to obtain teacher evaluations of student music learning and ability in only two sites: Montgomery and Thoreau (I did receive teacher evaluations at Newton, but these contained minimal variation and as a result were unusable). I also collected peer assessments, though due to the survey design, I have peer assessments only for students who participated in the survey and were also nominated by other students in a site (as being helpful to their music learning). Student self-assessments have been problematized by some researchers (Kruger & Dunning, 1999) as potentially unreliable, invalid, and misleading. In my data I find evidence to the contrary, which indicates a strong, statistically significant, and positive correlation among student, peer, and teacher assessments. Further, assessments that would entirely exclude students being assessed are opaque to student perceptions of their own learning.

External Validity. A further limitation of this study is that inference from my sample to a larger population is not supported on statistical grounds. I designed this study to serve

primarily as a proof of concept for the theory and methods I develop and apply, not as a means to generalize to groups or populations not included in this research. I did not use any kind of random sampling approach in my quantitative data collection, but rather tried to achieve a census in all four of my research sites—that is, complete student participation. I had relatively high response rates in my high school sites—61 percent and above—but a lower (9 percent) response rate at Wes Montgomery. Given that I did not achieve a full census in my research sites, the question emerges of whether my samples of respondents are representative of the populations in the research sites themselves. To maximize the chances that they would be, I worked to recruit all students at all sites, and I made the strongest efforts to include the hardest to reach groups. After the study was conducted, I also gathered student demographic data from my sites and found that my samples matched school-reported data to a large degree. This finding supports the claim that my samples are generalizable to populations in the sites where the research was conducted. While the mixed methods design I use adds strength to conclusions supported by multiple forms of data, I ask the reader to use caution when making any generalizations of the findings to populations outside of those in this research.

Additional Limitations of the Qualitative Research Component. I want to point out a few key limitations of the qualitative component of my study. Due to time and resource constraints, I did not collect any interview or focus group data from students in the high school sites. As a result, the qualitative data I do have are from a subgroup of students in my overall sample who have chosen to pursue music more seriously—just by virtue of their elective participation in the Wes Montgomery summer musicianship program. I do not have data from students in public schools who are pursuing music at a less focused or intensive level. This limits the generalizability of the qualitative portion of my study. Also, I met with students only once

and in a group setting. A single meeting, as opposed to a more prolonged engagement with students, may limit the richness and completeness of the qualitative data I was able to collect. I tried to address this limitation by allotting a significant amount of time for focus group meetings and covering topics thoroughly. Focus groups can be an efficient way to gather data from multiple respondents but also carry the risk that some participants may mimic responses of others or feel less comfortable speaking openly than they would in a one-on-one setting. To minimize these risks, I encouraged students to share their own points of view even if they differed from those of others in the group, and I worked to create a comfortable and friendly atmosphere in which students would feel that their views were valued and respected.

It is sometimes remarked that in much qualitative research, the researcher functions as the “instrument” that is used to measure the studied phenomena. I have made efforts to be self-aware and explicit—both to participants and readers—about positionality, biases, and predilections that I bring to this inquiry. Through the use of a mixed coding process, I actively engaged in a search for meaning and theory that emerged from the data themselves. These actions support what Miles and Huberman (1994) refer to as the confirmability of findings. I created my focus group interview protocols by consulting those used by other researchers (Green, 2002, 2008) and submitting my draft protocols to experts in the field to solicit their feedback regarding the relevance of my queries. These steps are key to establishing the dependability and reliability of the findings (Miles & Huberman, 1994).

Transferability in qualitative research describes the degree to which readers are able to make meaningful generalizations from the particulars of the study to another context (Miles & Huberman, 1994). To foster transferability in my study, I endeavored to provide thick descriptions of the music learning process tied to the stories and narratives of students.

To strengthen the credibility of my findings (a term analogous to internal validity in quantitative research), I triangulated among many data sources—both quantitative and qualitative—as I constructed conclusions. Disconfirming evidence and rival explanations were actively sought, and when identified, they were incorporated into the findings. I also attempted to offer rich and contextual accounts, what Geertz (1973) refers to as “thick” descriptions. I sampled participants in focus groups to form as representative a sample as possible of the overall summer musicianship program. However, the generalizations I make from qualitative data alone are intended primarily as generalizations to theory as opposed to generalizations to populations. Through thick description, or by other means, readers may (or may not) come to identify what Erickson (1986) terms “concrete universals,” in which they perceive something generally true about the music making or music learning process that is applicable to their lives and practice—whether directly or indirectly.

Other Limitations. I did not collect data from student family members, and I collected minimal data from teachers. My findings are limited in the sense that these important perspectives are not included. Further, I did not conduct site visits to observe students’ learning and engaging with music. Researcher observation of student learning would have added additional depth and specificity to an understanding of the ways music learning takes place. Finally, of the sites and individuals I identified as important in a music learning network, I focused a large part of my analysis on peer learning networks within schools. While I designed the study to try to capture the broad brushstrokes of the entire music learning network, we achieve a sharp focus on only a particular subsection of that network. This is also a clear limitation of the findings as well an opportunity for future research.

Chapter 4. Findings for Research Questions 1 and 2: Description of Music Learning Networks and Relationships to Music Learning Outcomes

In the first parts of this chapter, I will present findings from mutually informing qualitative and quantitative analyses to describe the nature of the music learning networks of students in this study and to identify the elements of those networks that students feel are most supportive of their music learning. A primary goal is to describe the composition and structure of student music learning networks at full-sample and site-specific levels. In the second part of the chapter, I test the hypothesis that students with richer networks (in terms of people, places, and resources) have learning outcomes that are higher on average than students whose music learning networks are less rich. I structure this chapter by research question, and within each research question, by data type (quantitative and qualitative).

Research Question 1 (Quantitative Findings): What are the most helpful relationships, settings, and resources that constitute a music learning network?

Participation in Music Learning Environments. Participants in this inquiry indicated that they engaged in music making and music learning in and across a range of settings. I identified eight settings as key environments in which music learning and engagement occurred in pilot research I conducted prior to my dissertation work (Linsin, 2012a) and through consultation with professional musicians and music education scholars. The constellation of settings is intended to be fairly comprehensive and to include all of the key settings in which students engage in music making and music learning. To the degree I was able, I created the categories such that they are mutually exclusive. I briefly define each setting below—I will refer to them frequently in this chapter and those that follow. By *setting*, I am largely, but not exclusively, referring to the physical space in which learning takes place. As I hope the

definitions below make clearer, I am also referring—to some extent—to the nature of musical engagement that occurs within a physical space.

School. This setting includes any and all music learning and engagement that takes place during the school day within the high schools in which students were enrolled.

Structured Extracurricular (Extra). Enrollment and engagement in a structured, music-focused after-school program.

Private Lessons (Private). Signals learning in one-on-one structured music lessons.

Home. Music learning and engagement—often solo practice and playing—occurring in a student’s house.

Online. Refers to music learning and engagement that happens online and outside of school (in a virtual space)—irrespective of the physical setting where the student participates in online learning. This could include structured online courses but more typically involves student perusal of music-focused Internet websites, such as learning a song by watching an artist performance on YouTube.

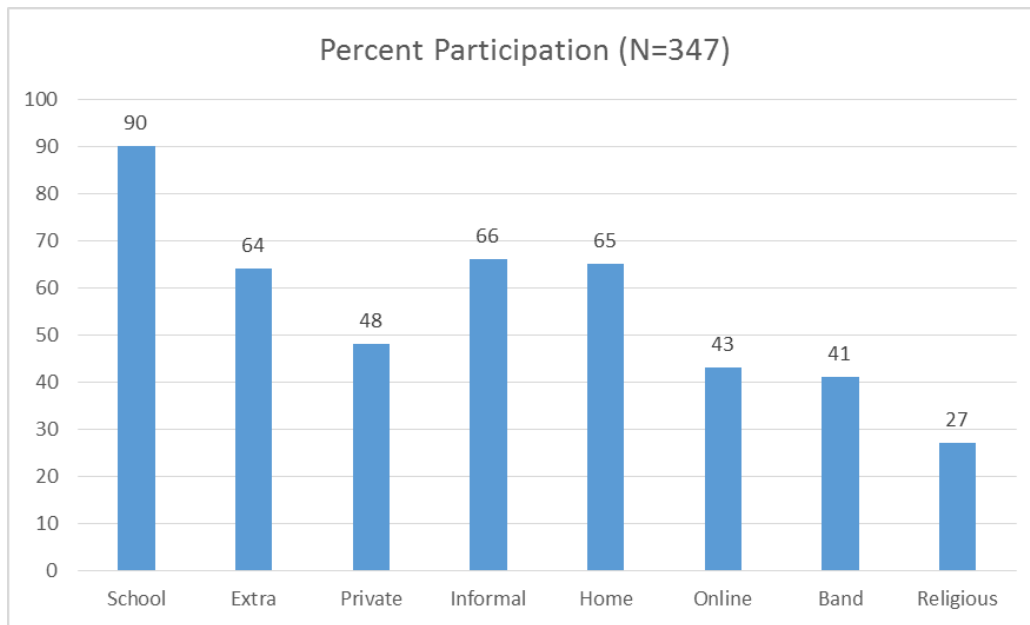
Band/ensemble (Band). Indicates student-led group music learning and engagement that takes place outside of school—e.g., in a community space. Engagement in this setting can include music performance for an audience. I do not mean to imply specific genres, instruments, or repertoire by using the term *band*.

Religious. Indicates music learning that occurs in a religious institution such as a church or synagogue.

Other Informal (Informal). Any student-chosen, student-led learning environment outside of the non-formal environments previously listed. For example, peers engaging in songwriting in a community space.

Figure 4.1 displays the student-reported frequency of participation by setting. Settings are grouped such that more formal settings—in school, structured extracurricular activities, and private lessons—appear on the left side of the table. Less formal settings—at home, online, band, religious, and other informal—appear on the right side.

Figure 4.1. Student Participation in Music Learning Environments



School and structured extracurricular activities were the formal learning environments in which students most frequently engaged musically. The structure of my sampling directly influenced these statistics. In the three high school sites, only students who were involved in school music in some way were included in the sample, meaning that these students were necessarily involved in music learning in school. Participation in the Wes Montgomery summer musicianship program was in and of itself participation in an extracurricular music activity. Just under half of the sample (48 percent) took private music lessons outside of school.

Among less formal learning environments, the majority of students in the sample engaged with music at home and other informal learning settings (apart from online, band, and religious environments). In a surprising finding, fewer than half of students indicated that they learned music online. I anticipated a much larger percentage. It could be that adoption of music learning technologies in my research sites is still in beginning phases. Socioeconomic status may play important roles, perhaps contributing to technology gaps. Alternatively, it is possible that the way I posed the question about online learning was construed by students more narrowly than I had intended. I believe the use of music learning technologies—particularly among low-income and otherwise marginalized musicians—is an interesting and potentially high-impact area for future research. A comparatively small, but significant (27 percent) proportion of students reported learning music in religious settings.

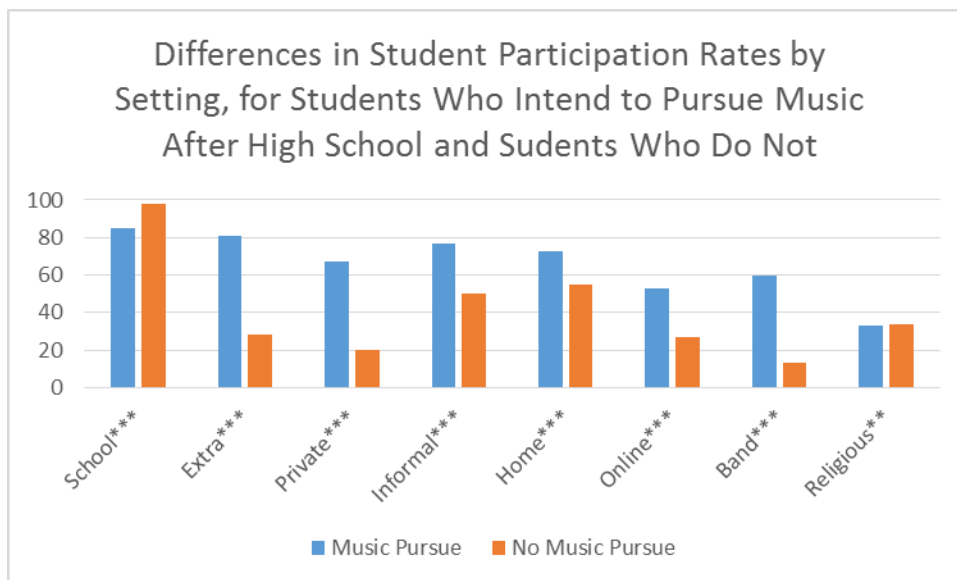
On average, students in the sample engaged with music in approximately four settings. This finding directly supports the music learning network (and ecological learning theory) hypotheses that students learn in and across multiple learning environments. Empirical findings here help us to quantify and to understand the nature of this participation. Student engagement frequently spanned formal and non-formal environments. This underscored the potential benefit of building bridges across the formal/ informal divide.

An important feature of this sample is that it is heterogeneous with regard to students' musical aspirations. Among study participants, 61 percent indicated they intended to pursue music in college, professionally, or both, while 39 percent indicated either that they would not or that they were unsure. It is reasonable to think the nature of musical participation—including engagement in music learning environments—might be significantly different between these two groups of students. Students who intend to pursue music beyond high school could, for example,

be more likely to pursue music learning in a greater number of music learning environments (perhaps private lessons and structured extracurricular activities, in particular) than students who did not intend to pursue music beyond high school. Musical aspiration and research site strongly correlated in my data. Two settings—Wes Montgomery College and Miles Davis High School— attract students who have prior experience with music and who must successfully audition prior to enrolling. Newton Academy and Thoreau High School, by contrast, attract a less-music-focused population, though they require enrollment in music or arts courses. As a result, I will at times disaggregate data by research site and/or student intent to pursue music beyond high school. I will consider the relationship between SES and participation (and other factors) in Chapter 5.

Figure 4.2 below shows differential rates of participation in music learning settings for students who intend to pursue music after high school and those who do not.

Figure 4.2.



+ p<.1, * p<.05, ** p<.01, *** p<.001

Overall, and perhaps not surprisingly, students who intend to pursue music after high school participate more frequently in music learning environments than students without post-high school music ambitions—with the exception of in-school and religious settings. All differences are statistically significant. At Montgomery, student interest in pursuing music after high school was high: 89 percent, compared to 43 percent averaged across all high school sites. However, not all students at Montgomery indicated that they engaged in music in high school (26 percent did not). This helps to explain the finding that—in this sample—a greater proportion of students who do not aspire to pursue music beyond high school are engaging in high school based learning than students who do. The fact that more than a quarter of Wes Montgomery students—adolescents who have largely demonstrated an interest in and commitment to music—indicate they do not engage in music learning in high school may point to an opportunity to provide additional supports to adolescent musicians in high school settings. Further, nearly all students in this study who indicated they were not interested in pursuing music after high school were engaged with in-school music in some way. While this proportion is likely overestimated if extended to a larger population (given the limitations of in-school sampling mentioned earlier), I believe it signals an additional opportunity. Schools can serve to stimulate student interest in music, perhaps in particular for students who may not receive this stimulation in other settings in their lives.

The largest differences in participation among students interested (and not interested) in pursuing music after high school occurred for private lessons, structured extracurricular activities, out-of-school band, and online. Setting SES aside for the moment, it is plausible that this may be the case in part because private lessons, structured extracurricular activities, and bands are perceived by students to be specialized, music-focused environments, and only

students with pre-existing musical interest self-select in. There also is often a cost associated with private lessons and structured extracurriculars. Engagement with music learning online (to the extent technologies are made available to students) has neither barrier. This virtual setting could also be low-hanging fruit when it comes to structured efforts to support music learning. According to these data, it is a relatively underutilized resource. Engagement with music in religious settings is approximately equivalent for both groups of students.

I want to make one more point here about student engagement in music learning environments. In this sample, settings are systematically related to one another with regard to student participation. In other words, with the exception of school settings, students who participated in one learning environment were more likely to participate in another. Table 4.1 below is a correlation matrix showing correlation coefficients and associated significance levels for each pair of settings.

Table 4.1. Music Learning Setting Participation Correlation Matrix

		Setting Correlation Matrix						
	School	Private	Band	Extra	Online	Religious	Informal	
School	1.00							
Private	-0.21	1.00						
Band	-0.18	0.50	1.00					
Extra	-0.27	0.59	0.41	1.00				
Online	<i>-0.05</i>	0.24	0.31	0.29	1.00			
Religious	<i>0.10</i>	0.19	0.22	0.25	0.30	1.00		
Informal	<i>-0.07</i>	0.34	0.30	0.38	0.29	0.18	1.00	

Note: All values significant at the $p < .001$ level, except for italicized values, which are significant at the $p < .05$ level.

The relationships shown in the correlation matrix lend support to the notions—advanced by Bell et al.’s (2009) ecological learning theory and the music learning network framework—that students navigate in and among multiple learning environments to pursue learning that is

significant to them. Further, these data reveal some of the within-sample structure across learning environments. Correlations were strongest (.41-.59) for private lessons, extracurricular activities, and out-of-school bands—these correlations are highlighted in green in the matrix. These are activities that students interested in music may often gravitate to. Participation in music in school was negatively correlated with participation in all other settings except in religious centers—these correlations are highlighted in yellow. This finding is likely an artifact of the sampling structure of this research and should not be construed to indicate that participation in music in school in any way discourages music participation in other settings.

Setting Skill Profiles. A hypothesis that emerges from the music learning network framework is that different learning environments may have different affordances, or advantages, for learners. By this I mean that the musical skills students acquire may be different from setting to setting. Some types of learning environments may be better equipped to offer particular skills or sets of skills to learners.

In order to investigate this hypothesis, I asked students to report the music-related skills they felt they acquired in the settings in which they learned music. I inquired specifically about seven skills and abilities—frequently emphasized in music assessment rubrics—that I would argue are centrally important for musicians: 1) performance, 2) appreciation, 3) creativity, 4) composition, 5) theory, 6) ear training, and 7) reading. I will briefly define what I mean by each skill below.

Performance: Technique, facility, on a student's principal instrument, and the ability to transmit music to others.

Appreciation: Ability to engage with, interpret, and respond to the music of others.

Creativity: Ability to create new combinations of sounds, or interpretations of existing works, of significance to the student and/or others.

Composition: A creative musical activity involving the generation of original music, often making use of some music notation symbol system.

Theory: Knowledge of the structure and/or function of key musical elements such as rhythm, harmony, and melody.

Ear Training: Ability to discern musical elements such as pitch, timbre, harmony, and melody aurally.

Reading: Ability to decode music notation symbol systems, such as standard notation, often involving performance of the written music on one's instrument.

Conceptually, these musical skills and abilities can be clustered into two groups. The first group involves more theoretical and symbol-based abilities and includes composition, theory, ear training, and reading. The second group is more aural/physical, and not necessarily symbol based. It includes performance, appreciation, and creativity.

Table 4.2 below displays my findings for the sample in a single matrix. Columns represent settings, and rows represent skills. The number inside each cell is the percentage of students who reported learning a specific skill in a setting, among the total number of students who participated in that setting. The cells are color-coded using a heatmap scheme such that cells containing higher values are blue (darker blue for highest values), and red for lower values (darkest red for lowest values). The matrix is divided into quadrants. The upper-left quadrant shows the proportion of students who learned aural/physical music skills in formal environments. The upper-right quadrant displays percentages for aural/physical skills learned in less-

formal/non-formal environments. The lower-left quadrant shows theoretical/symbol-based music skills learned in formal environments, and the lower-right, theoretical/symbol-based skills learned in less-formal/non-formal environments.

Table 4.2.

Percentage of Students Learning Skill by Setting from Whole Sample (N=347)								
	School	Extra	Private	Informal	Home	Online	Band	Religious
Performance	62	65	79	39	50	36	70	42
Appreciation	49	55	63	61	59	54	61	49
Creativity	40	48	57	55	59	36	56	41
Composition	36	42	40	29	38	32	45	13
Theory	60	57	70	23	25	41	34	12
Ear Training	46	57	55	24	38	47	36	30
Reading	57	56	64	13	25	27	34	14

Looking first together at the upper- and lower-left quadrants we see that—comparatively speaking—high proportions of students are learning aural/physical and theoretical/symbol-based music skills in formal learning environments. Private lessons emerge as the setting (out of all settings: formal and less formal) in which the highest proportion of students report learning music performance, appreciation, theory, ear training, and reading. This finding suggests that private lessons may be particularly valuable learning opportunities for young musicians—particularly well-suited for imparting some musical skills that could be more challenging to acquire elsewhere. Among formal learning environments, the skills that students least frequently report learning are creativity and composition. While these data may not be representative of larger populations, this finding could be construed as an invitation to investigate the existing and potential roles of creativity and composition in music curricula. Proportions of students reporting learning music skills in formal environments are comparatively high among all settings in this

study, but the percentages are not as high as they could be. For example, fewer than half of students who learned music in schools reported learning about music appreciation, creativity, composition, or ear training. In other words, these data would suggest that within schools, for example, there may be room for some targeted improvements in music education.

Turning our attention to the informal learning environments on the right-hand side of the matrix, we observe some intriguing patterns. Higher proportions of students report learning aural/physical musical skills than theoretical/symbol-based skills in non-formal settings. These data are congruent with a story in which formal learning environments—school, structured extracurriculars, and private lessons—are the primary (and in some cases perhaps necessary) settings for students to acquire specialized theoretical/symbol-based musical skills and knowledge. Home is the setting in which the largest proportion of learners felt they were able to develop their musical creativity. This finding underscores the importance and complementarity of non-formal music learning settings. I am puzzled by the relatively low proportion of students in this study who indicated that they learned music—aural/physical or theoretical/symbol-based—online. This stands as an interesting area for future research. I acknowledge that the musical skills I have chosen do not create an exhaustive list of what is involved in the music making enterprise, and the definitions I have offered are necessarily limited. My intent in doing so has primarily been to investigate variation in learning across multiple settings.

Peer Learning Networks: Visualization and Descriptive Statistics. The music learning network framework asserts that learning is—at least in part—a networked phenomenon. I have argued that through the use of social network analysis techniques we can represent meaningful patterns and structure within these networks. Further, according to the framework, we can examine music learning at multiple levels—from individual to whole-network. To investigate

these theoretical assertions, we will now examine the within-school (or within extracurricular activity, in the case of Wes Montgomery) peer learning networks included in this study. The primary goal at this point is to describe the network structures we observe in each of the four research sites, and to begin to draw some basic comparisons between networks.

The sociograms in Figures 4.3 through 4.6 below display the peer music learning networks present at the four research sites. The squares in the figures represent students, or nodes. A line connecting two students indicates the presence of a learning relationship between these students. The direction of the arrowhead at the end of a line indicates the direction of the learning relationship—if a line points from student A to student B, student A nominated student B as someone who has been helpful to their music learning. A double-headed arrow represents a reciprocal learning relationship in which both students A and B indicate learning from one another.

The size of the square, or node, is proportional to the overall music ability of the student it represents—beginner (small node), intermediate (medium node), or advanced (large node). This value was calculated by averaging student self-reported music ability (theory and performance combined) with peer-reported overall ability. In cases where I had only data that were peer-reported, e.g., students nominated by peers who did not themselves participate in the survey, I used only peer ratings. I used only self-reported ratings if no peer ratings existed for a study participant. In the case where I had multiple peer ratings of a single student, I first averaged those peer ratings to obtain a single value, and then averaged that value with self-reported ability. For visual simplicity and contrast, I created three categories—beginner, intermediate, and advanced—by partitioning the continuous ability variable into three bins, each representing an equal proportion of the total ability range. Finally, node color represents music

classrooms where the survey was conducted. Purple nodes indicate no classroom data was available for a particular student; otherwise, the colors themselves have no significance other than to differentiate students in different classrooms. Wes Montgomery is the exception because surveys were completed online. I do not have student classroom data for this site—as a result, nodes are monochromatic.

The color of the tie between students indicates the type of setting in which the learning primarily took place: red indicates out of school, and blue indicates in school. In the upper left of each network diagram, survey participants who nominated no peers as helpful in their music learning are displayed in a vertical column. These kinds of network actors are referred to as isolates in the network literature.

Figure 4.3. Newton Academy

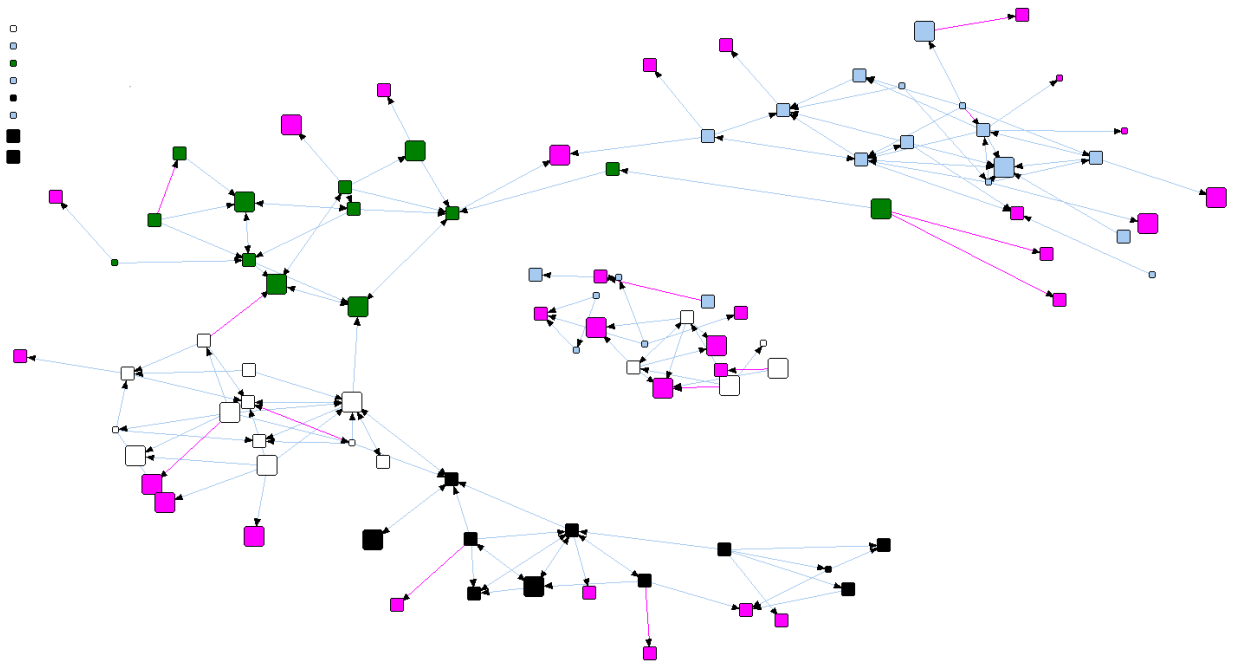


Figure 4.4. Thoreau High School

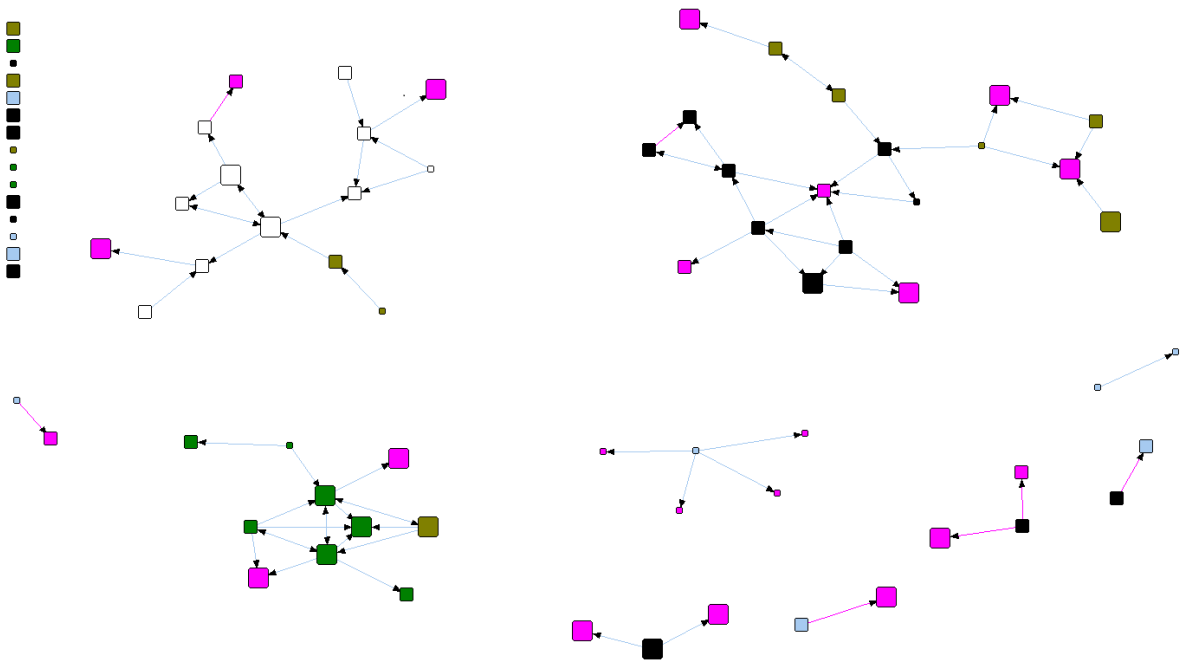


Figure 4.5. Miles Davis High School

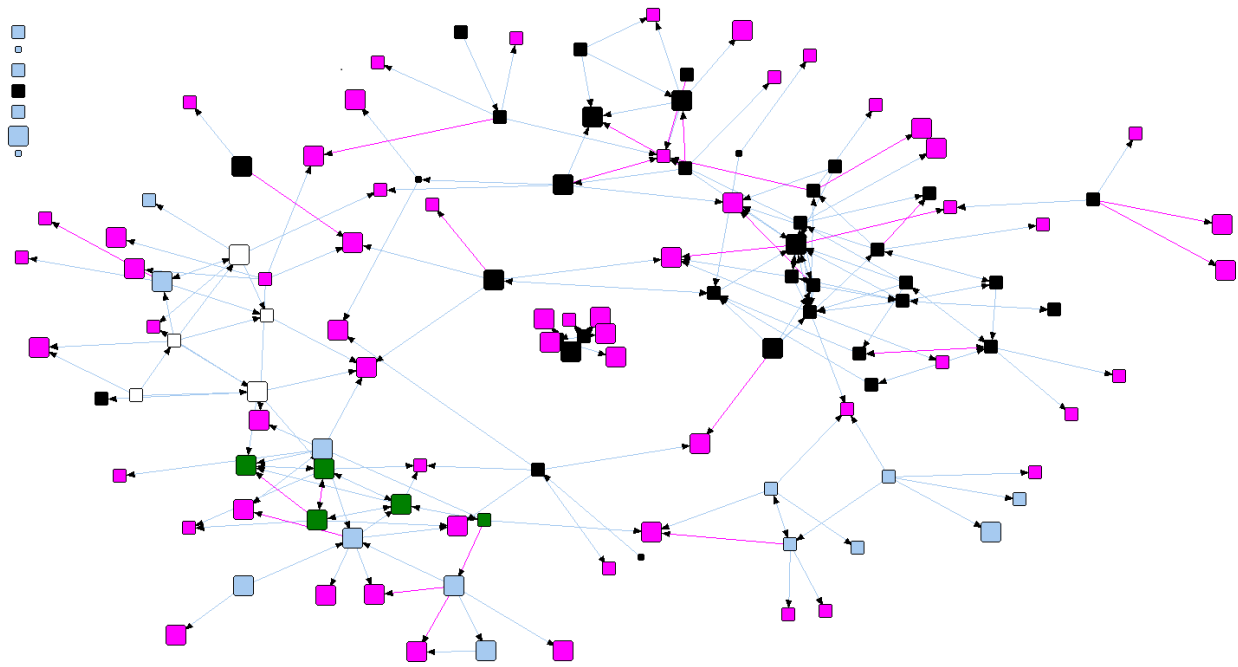
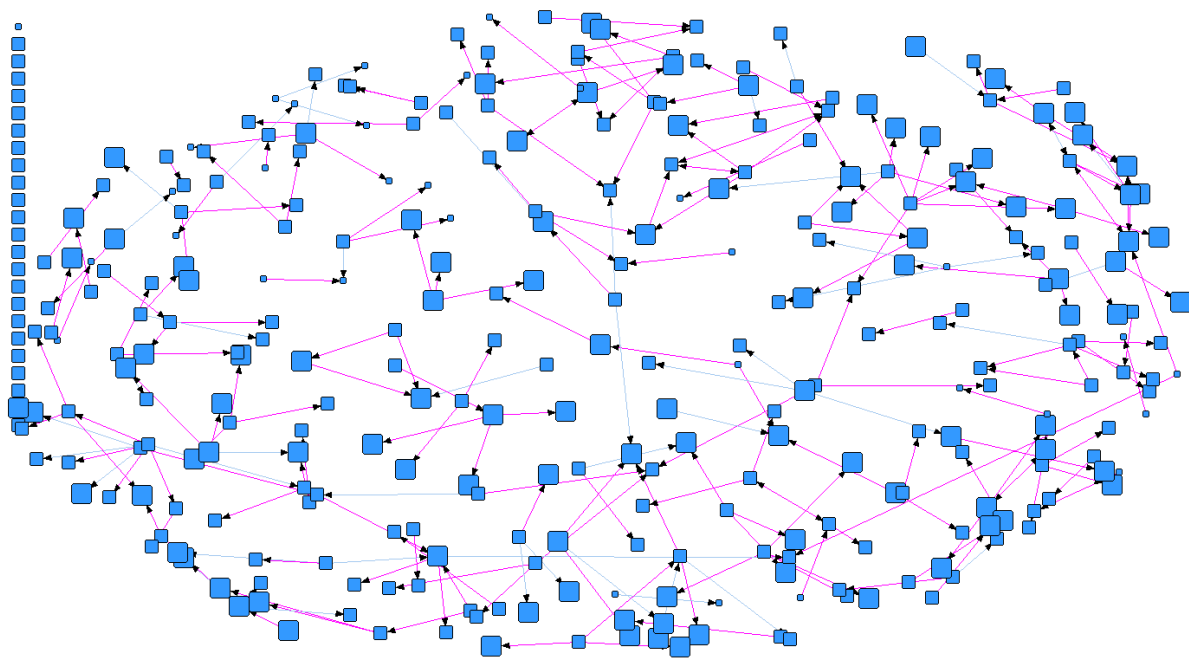


Figure 4.6. Wes Montgomery College of Music



Visually examining these sociograms can provide insight into the structure and function of the music learning networks in each of the four research sites. Looking first at Newton Academy—Figure 4.3—we observe that colored nodes are clustered together. While students were free to nominate any peer within their school they believed to be helpful to their music learning, the large majority tended to nominate peers in their same class. Classes are not entirely isolated from one another, but are weakly connected by one or two learning ties. This finding suggests that at Newton, music learning may be somewhat compartmentalized—occurring primarily within, and not across, classroom settings. To the extent that more connected within-school learning environments may be valuable—as means to facilitate learning or even as ends in and of themselves—these data suggest that there may be opportunities at Newton to forge a more connected music learning environment.

Notice also that learning ties are primarily blue, indicating that the majority of music learning exchanges between peers are occurring within school. It may be the case that a larger proportion of learning relationships would have involved out-of-school learning had I not restricted peer nominations to those students who attended the same school. It also may be the case that at Newton, students might benefit from greater engagement in out-of-school music learning. Advanced musicians—represented graphically by the largest nodes—tended to be nominated as helpful by a greater number of peers than intermediate or beginning-level musicians. As a result, advanced musicians are often more central in the Newton network—a phenomenon that occurs in all research sites in this study.

Thoreau High School is similar to Newton in the sense that both are Title I high schools, in which music (or art) is a required course, though neither high school is primarily music focused. Their music learning network structures also resemble one another. Students in

Thoreau, like Newton, tended to nominate peers in their same classroom as helpful to their music learning. The peer music learning network at Thoreau was less connected than Newton, and is largely composed of isolated subgroups of students within music classes. The two networks are also alike in the sense that most peer music learning occurs within and not outside of school.

Miles Davis High School (a performing arts high school) has a peer music learning network that is more connected than Newton or Thoreau. At Miles Davis, it is still possible to detect clustering by classroom, but overall, more learning ties exist between students in different music classes. Part of the reason for this may be that at Miles Davis, students may have the opportunity to engage musically with peers in multiple classroom settings. For example, if students A and B have a learning tie between them but are in different classrooms with respect to survey sampling, they may interact musically in school in a different classroom setting. Alternatively, students at Miles Davis may be interacting during the school day outside of a classroom setting, e.g., during lunch. Also, while the majority of learning relationships at Miles Davis are occurring within school, a higher proportion of out-of-school ties exist than at Newton or Thoreau.

As we would anticipate, given that Miles Davis High School is a performing arts school in which music students must audition in order to be admitted, the musical ability level of students at Miles Davis—represented in the sociogram by node size—is higher than at Newton or Thoreau. We can also observe that a smaller proportion of students at Miles Davis are isolates (having no learning ties with peers in the network) than at either Newton or Thoreau. These music learning network figures allow us to see which learning ties exist, but also those that could potentially exist—e.g., for students who are isolated but who may desire connection and between insular classroom settings that may operate in relative isolation from one another.

The Wes Montgomery College music learning network, while larger than the high school networks, is relatively unconnected. This is most likely an artifact of the lower survey response rate at Montgomery (9 percent, compared to 61-67 percent in the high schools). Like Miles Davis, students at Montgomery have higher music ability, on average, than those at Newton or Thoreau. Surveys at Montgomery were completed online, and as a result I was unable to examine clustering by classroom. A key difference of the Montgomery site is that learning ties are primarily out-of-school (as indicated by the purple ties between nodes).

Table 4.3 below summarizes key network descriptive statistics.

Table 4.3. Network Descriptive Statistics by Research Site

	Montgomery	Miles Davis	Newton	Thoreau
Students	320	126	99	78
Ties	253	194	155	75
In School	19%	85%	91%	89%
Hours	~4-8	~2-4	~1-2	~2-4
Friend	95%	97%	94%	99%
Ability	6.55	6.9	5.84	5.43

The Montgomery summer musicianship program is the largest network, with 320 students, followed by Miles Davis with 126, then Newton with 99, and finally Thoreau with 78—for a grand total of 623 students and 677 ties across four networks. This number is larger than the total sample size for survey participants—347—because survey participants at times nominated peers who had not themselves completed the survey. In the three high school sites, 85 percent (or more) of peer-to-peer music learning took place inside of school. On average, students at Miles Davis and Thoreau reported spending between two and four hours per week with each peer in their learning network. At Newton High, students learning music spent less

time together per week on average—between one and two hours. By contrast, only 19 percent of students at Wes Montgomery engaged in music learning together in school. The remaining 81 percent engaged in music learning and music making outside of school walls, and for significantly longer periods of time, on average, than the high school networks: between four and eight hours. The non-music-focused sites—Newton and Thoreau—had lower levels of student musical ability than the music-focused sites—Montgomery and Miles Davis.

In all sites, a large proportion of students reported engaging in music learning with peers who were also their friends—between 94 and 99 percent, depending on the site. This finding, while perhaps not counterintuitive, is stark. Music learning networks among students were also (for the most part) friendship networks—students both learned from and supported peers with whom they also shared a friendship. A possible interpretation of this finding is as follows: the social and relational skills that may be required to support friendships can be very related to the learning networks, and by extension, learning and engagement opportunities of students.

Table 4.4 displays select descriptive statistics calculated separately for each network.

Table 4.4. Additional Network Descriptive Statistics by Research Site

	Montgomery	Miles Davis	Newton	Thoreau
Nodes	320	126	99	78
Ties	253	194	155	75
Mutuals	0	0.002	0.004	0.002
Asymmetrics	0.005	0.02	0.024	0.02
Nulls	0.995	0.978	0.972	0.977
Avg Degree	1.582	3.08	3.112	1.924
Density	0.002	0.012	0.016	0.012
Out-Central	0.016	0.028	0.036	0.053
In-Central	0.01	0.052	0.056	0.053
Connectedness	0.004	0.062	0.07	0.024
Closure	0.141	0.213	0.267	0.375
Avg Distance	1.396	3.185	3.141	1.669
Diameter	4	10	8	5

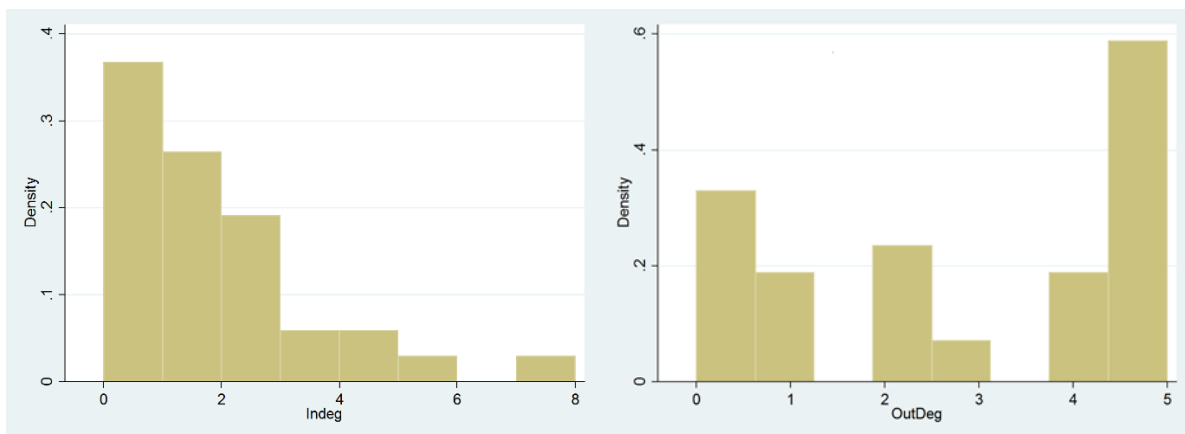
The three high school networks are denser than the Wes Montgomery summer musicianship peer learning network. This is likely in large part a result of differential survey response rates by site, with Montgomery having by far the lowest response rate: 9 percent, compared to the three high school sites, with response rates between 61 percent and 67 percent. As a result of missing data, it is not always clear whether an absence of a tie between two actors accurately indicates that no learning relationship is present between these two actors, or whether the absence is a consequence of missingness. At Montgomery, the density statistic would likely be reduced more than in other sites as a result of a significantly lower response rate. Newton had the highest proportion of mutual (or reciprocal) learning ties, .004, followed by Miles Davis and Thoreau. Montgomery had no reciprocal learning relationships, again probably more of a reflection of low survey response rates than a difference in network structure. The proportion of asymmetric ties in the three high school sites was similar—approximately .02. The average degree value for each graph—the sum of the indegree and outdegree measures for each node divided by the total number of nodes in a graph—varied across high school sites. The number

was above 3 for Newton and Miles Davis and slightly below 2 for Thoreau. Montgomery again had a lower value (1.58), though this again is likely a reflection of low sample response rate.

Music Learning Network Homophily: Miles Davis High School. In social network research, *homophily* refers to the tendency of individuals to form ties with others similar to themselves. *Heterophily*, or anti-homophily, is the tendency for individuals to gather in groups that are diverse. I use the Miles Davis High School music learning network to explore student grouping, examining five variables: student’s principal instrument, overall music ability level, race/ethnicity, SES, and classroom. I calculate homophily with the E-I index using UCINET (Borgatti & Johnson, 2013) social network software. The measure works by computing the number of ties external to mutually exclusive subgroups (E), subtracting the number of ties internal to the groups (I), and dividing by the total number of ties (E+I). The resulting value ranges from -1 to 1, with -1 representing complete homophily, and 1 heterophily.

Frist we will briefly examine the indegree and outdegree distributions in the Miles Davis music learning network. Figure 4.7 below displays the distributions as histograms.

Figure 4.7. Histograms Displaying Indegree and Outdegree Distributions in the Miles Davis Music Learning Network.



As is often the case in social networks, the indegree distribution is positively skewed. The majority of students are nominated by relatively few peers as being helpful to their music learning, while a smaller number of students are nominated by many peers—functioning as hubs in the network. The outdegree distribution is negatively skewed, however students at Miles Davis tend to form learning ties with their peers, nominating on average approximately 3 peer supporters. The modal outdegree value is 5 peer supporters. This distribution exhibits a ceiling effect imposed by a data collection constraint—students were able to nominate a maximum of 5 supportive peers within their school.

Table 4.5 below displays the E-I indices for the six variables explored. The E-I index provided evidence for homophily for the three variables on the left-hand side of the table (classroom, instrument, and race), and heterophily for the two variables on the right-hand side (music ability and SES).

Table 4.5. Homophily and Heterophily Measures for Miles Davis High School

Homophily		Heterophily	
Classroom	-0.78	Ability	0.56
Instrument	-0.56	SES	0.37
Race	-0.21		

Note: Reported values of E-I index, where -1= homophily and 1=heterophily.

While not as strongly as Thoreau or Newton, learning relationships between students at Miles Davis tend to form between students in the same class. Classrooms likely function as a kind of geographic constraint, inducing—at least in part—homophilous ties among students within them.

If true, this finding may help pose interesting structural questions for schools interested in

fostering learning ties between students who do not attend classes together. There is also evidence at Miles for learning network homophily by instrument. That is, students tend to form music learning relationships with other students who play the instrument that they do. In one sense, this is intuitive. If I play guitar and desire to improve on my instrument, I may be more likely to form a learning tie with another guitarist. On the other hand, to the extent that a goal of mine is to play in ensembles—which are often heterogeneous with regard to instrument variety—I might be more likely to form learning ties with peers whose instruments are different from my own. These data are consistent with the possibility that at Miles Davis instrument-specific learning motivations for forming learning ties may outweigh ensemble-driven motivations.

While weaker than classroom or instrument variables, there is evidence for homophily within Miles Davis High School by race/ethnicity. Even so, it is possible to imagine that engaging with music (at Miles Davis and elsewhere) could promote peer ties across traditional racial/ethnic lines. It could be, for example, that while we observe homophily by race/ethnicity in the Miles Davis music learning network, the level of homophily is less than what it would have been had students not been engaged in music learning. This line of reasoning is speculative at this point, but it signals possibilities for empirical work. In future work with these data, it will be possible to explore whether racial/ethnic homophily varies across genre-specific subnetworks. In other words, it could be that students' shared interest in a particular style of music—rock music, for example—could function as a kind of superordinate identity and lead to bridging learning ties across racial/ethnic lines.

At Miles Davis, students tended to form learning ties with peers with higher music ability levels than themselves. As a result, we observe diversity (or heterophily) with regard to music

ability in the network. This finding is consistent with the idea that learning ties—rather than being the result of homophilous groupings of students by music ability—may be formed between students of different abilities for the purpose (at least in part) of transmitting musical knowledge and skills from more experienced musicians to those who are less experienced. The question of selection versus influence (or homophily vs. contagion) features centrally in the social network research literature (Lewis, Gonzalez, & Kaufman, 2012; Shalizi & Thomas, 2011). Statistically disentangling the two processes is complex, problematic, and typically requires longitudinal data (that I did not collect in this study). I tread briefly into this space, in part to acknowledge this complexity—and challenge, when it comes to interpreting network data—but also to offer some evidence I do have that is consistent with the possibility that the learning network I observed at Miles Davis functions in part as a structure through which knowledge and skills are transmitted (often from more skilled to less skilled musicians). I intend to further investigate this possibility in future work. Briefly, we also observe heterophilous ties by SES. As with race/ethnicity, it may be the case that engagement with music learning can promote learning ties between students across lines in some settings, but more research is needed to credibly establish this relationship.

Research Question 1 (Qualitative Findings): What are the most helpful relationships, settings, and resources that constitute a music learning network?

For the first research question, I attempt to use qualitative data to add a longitudinal component to an otherwise cross-sectional study by probing student perceptions of how and why their learning connections change over time. Below I present interview data and analysis related to this area of inquiry.

Music Learning Networks over Time. These qualitative data shed light on multiple dimensions of networked music learning among students. These dimensions include the

formation of learning ties, the integration of settings and connections to maximize support for learning, reciprocal learning, and the selective formation and dissolution of learning ties.

Students played an active role in this process. They forged and pruned network connections over time, reaching out to potential supporters and moving away from those who they felt were less supportive.

Focus group respondents articulated the importance of forming ties with others in music in order to support their own learning and further their musical development. They reported actively seeking out these relationships. Multiple participants indicated that “making connections” was one of the primary reasons that they chose to attend the Montgomery summer musicianship program. Students reported that some of their deepest learning occurred when they synthesized learning connections across multiple environments and input from multiple supporters. Mike responded to my question about which settings and supporters were most supportive of his music learning this way:

A variety. Have a private lesson, a group of four or five kids, and a group ensemble.... So if you were to do that that would kinda hit as many bases as possible. And I feel that’s kinda been my experience too.

Maria agreed, and commented about the way in which she believes individual and group hands-on experiences making music enable a student to acquire theoretical musical knowledge from texts more deeply and more readily:

I think you start playing and you start learning from you and from other people and you start to get better, and then when you really look at a theory book, you’re like “oh, that’s why,” you know?

Participants further elaborated on the idea that peer-to-peer learning is a valuable complement to formal instruction.

Several respondents discussed their experience with reciprocal learning ties. Howard described the iterative, dynamic, and evolving music learning connections with his peers this way:

We always bounce ideas off each other, like if one of us finds the new trick, or like a new recording, kinda like a nerdy thing, we'll go to the other's room and share it immediately. That's one guy. There's so many others. When you're a student here you can't really think of everyone, especially not at once. Also that bassist in the band I'm currently playing has kind of pushed me to a new level also, and I'm not a bassist.

Mike, a high school saxophone student, but also a teacher, said this: "I teach [inner city] elementary school kids the basics of the saxophone or the trumpet. And even from them I learn a lot. And so when you put peers in leadership positions they learn from their peers and vice versa. It goes both ways in every relationship." Participants stated that they gravitated toward learning connections they felt would be rewarding, indicating that often they were, but some expressed the need to distance themselves from individuals who were unsupportive (or even destructive) of their music learning. Makana offered these comments:

I've had a lot of people, you know warn me, "You just gotta be careful, there are a lot of people who will try to crush you, and there's a lot of people who will help support you, and you gotta weed the two categories apart and try to stick with the supportive." So yeah, a lot of people have been very supportive, and a lot of people have tried to [deter] me, but overall it's mostly been supportive.

Howard added his thoughts:

Most of the people I respect and I'm close to, almost everybody has accepted and kind of encouraged me to do what I do at school. But there is definitely a different subset of people, who, I guess don't understand music as a means to ... as your life. People who think you need a non-musical job to be successful or think that the chances are minuscule. I think most people don't realize that you can make a living in many many different fields of the music industry.... That's why I don't associate with as many of those people.

These qualitative data are consistent with the music learning network framework hypothesis that students play an active role in shaping their learning ties over time. The student responses above help us to understand how that is taking place for some students at Wes Montgomery College of Music.

Research Question 2: Do students with richer connections to people, settings, and resources in a music learning network exhibit more positive learning outcomes on average than those without these connections? If so, which relationships, settings, and resources are most strongly associated with higher levels of music learning?

Quantitative Findings. What kinds of systematic relationships exist, if any, between students' music performance ability and their learning relationships, individual attributes, SES, and demographic characteristics such as race/ethnicity? I use regression modeling to explore this question. I want to preface this section by underscoring that the findings that follow should not be interpreted to be causal—alternate research designs and analytic strategies will be needed to address causal questions. The social network covariates must be interpreted with particular

caution because of the risk of confounding network selection and influence. I would hypothesize that selection and influence are jointly functioning in the learning network, and I have explored network homophily measures to investigate this conjecture. Future network research and longitudinal designs will be needed to statistically disentangle them. I intend the regression models to function as a proof of concept in which network indices and student characteristics are jointly associated with learning outcomes, not at this point to establish or intimate causality, but to explore relationships and inform future research.

Table 4.6 below displays a taxonomy of seven regression models predicting music performance ability as a function of key question and control covariates. The models progress sequentially from most preliminary (Model 1), to a full model (Model 6), to a final model (Model 7) in which some predictors that are not statistically significant are removed. I utilize the full sample (347 students) for all models and utilize a maximum likelihood missing value (MLMV) estimator, enabling me to retain observations for which there are some missing data. R square statistics are reported and represent the variation “explained” by the model, and log likelihoods are also reported to indicate the goodness of fit of the model.

Table 4.6. Taxonomy of Regression Models Predicting Music Performance Ability

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
indeg	0.22*	0.21*	0.22*	0.26**	0.25**	0.24**	0.23**
	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.07)
outdeg	0.18*	0.05	0.05	0.04	0.03	0.03	
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	
between	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	
totalsetting		0.03***	0.03***	0.02**	0.02*	0.02*	0.02**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
locus		0.47***	0.45**	0.39**	0.36*	0.33*	0.36**
		(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)
musicmulti		0.22***	0.21***	0.18***	0.18***	0.17***	0.18***
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
ses			0.32	0.01	0.18	-0.01	
			(0.32)	(0.42)	(0.45)	(0.45)	
montgomery				0.62	0.81+	0.41	0.18
				(0.40)	(0.44)	(0.48)	(0.39)
miles				0.58+	0.75*	0.43	0.33
				(0.35)	(0.36)	(0.43)	(0.41)
newton				0.04	-0.00	0.13	0.19
				(0.33)	(0.33)	(0.33)	(0.32)
black					0.60+	0.56	
					(0.36)	(0.36)	
hispanic					0.14	0.27	
					(0.40)	(0.39)	
asian					-0.36	-0.31	
					(0.71)	(0.70)	
otherrace					0.02	0.26	
					(0.57)	(0.57)	
multirace					0.13	0.20	
					(0.36)	(0.36)	
lnmonthsplaying						0.28+	0.27+
						(0.16)	(0.16)
age						0.13	0.14
						(0.09)	(0.08)
male						0.42+	0.42+
						(0.22)	(0.22)
grades						0.06	
						(0.14)	
constant	4.95***	1.34*	1.34*	1.58**	1.47+	-1.78	-1.47
	(0.20)	(0.57)	(0.56)	(0.59)	(0.76)	(1.70)	(1.51)
R-sq	0.05	0.28	0.29	0.29	0.30	0.32	0.31
LL	-3557	-5771	-5851	-6115	-6414	-7625	-4773

= "+ $p < 0.10$

* $p < .05$

** $p < .01$

*** $p < .001$ "

(Standard errors in parentheses)

Model 1 predicts music performance as a function of three covariates—indegree, outdegree, and betweenness (an additional measure of network centrality). Indegree and outdegree are statistically significant in the model (betweenness is not), and are both positively associated with music performance ability. In Model 2, I add three additional predictors: a variable representing the quantity and quality of the music learning environments in which a student engages (*totalsetting*), locus of control (*locus*), and the number of musical styles a student plays (*musicmulti*). All of these coefficients are statistically significant and positively related to music performance ability. An interesting, perhaps not counterintuitive finding at this stage of analysis was that the total number of settings in which students engaged in learning was not a statistically significant predictor of their learning. Only once a variable was created that included setting quality as well as quantity did a positive and significant relationship appear. Outdegree becomes insignificant in Model 2 after statistical control for the added covariates.

I add a single covariate in Model 3—SES, which is positively related to the outcome (higher SES associated with higher music performance ability), but it is not statistically significant. I will investigate SES more thoroughly in the next chapter but want to point out for now that by itself SES is significantly and positively correlated with music ability but is also correlated with other predictors in Model 3, which are likely “absorbing” some of the effects of SES. In Model 4 I add indicator variables for sites, with Thoreau serving as the reference category. Site confidence intervals overlap substantially, suggesting that sites may not differ substantially from one another with regard to student music performance ability after statistical control for network, setting quality, music style, and locus of control covariates. Note that while it is not statistically significant, the coefficient for SES in Model 4 declines in magnitude (from

.32 in Model 3 to .1 in Model 4). Given that student SES varies greatly across my research sites, indicator variables for site are likely picking up some of that variation.

Racial/ethnic indicator variables are added in Model 5 with White as the reference category, as well as variables indicating native language and country of origin. Language and country variables, while part of Model 5 (and Model 6) are not displayed in the tables for reasons of visual simplicity. In Model 6, I add a final set of control covariates including students' total time playing their instrument, student age, gender, and self-reported grades. The natural log of total months playing is positively related to music performance ability and is moderately statistically significant. Males, on average, seem to be doing slightly better than females, controlling for other model covariates. Model 7 is the final model. It is identical to Model 6 with the exception that many nonsignificant predictors have been removed. The final model explains 31 percent of the variation in the outcome and has a log likelihood that indicates it is the best fitting model—among Models 2 through 7.

Note that for Models 2 through 7, the coefficients for indegree, setting-quality, locus of control, and number of musical styles played remained relatively constant in magnitude and statistical significance. These variables appear to be explaining unique variation in the outcome that other model covariates are not. I have fit similar models predicting music theory ability and have found similar relationships in type, magnitude, and significance of predictors. Network indices and musical setting-quality remain salient. I will more deeply explore and compare these models in future work.

I want to briefly address a further limitation of this work that is relevant to the regression models I have presented. Given the nature of my data collection, my sample may be weighted toward those students who keep participating in music. I have conducted preliminary robustness

checks to investigate this potential source of bias. There is a small (.04) correlation between age and the natural log of students' total experience (in terms of months playing) on their instrument. The correlation is not statistically significant and suggests that unlike other school subjects, such as reading or math, there may not be a grade-wise progression of music ability over time. Also, I find that for each research site, students are uniformly distributed across grade, indicating there is no evidence that I have oversampled students in higher grades. I control for the natural log of the number of months students have been playing their instrument. However, a possible limitation of this specification is that other covariates in the model are not interacted with the amount of time playing. I relaxed this assumption by creating interaction terms between the natural log of months playing and instrument and statistically significant predictors in Model 7 and adding them to the final model. None were statistically significant with the exception of $\ln\text{monthsplaying}*\text{indegree}$. Including it in the model did not appreciably or substantively alter the results, so I have omitted it in the final model.

Qualitative Findings. Here I present analyses of the focus group data I collected to explore not only which people and settings students engage with, but how and why these connections functioned to support learning. These analyses of student perceptions add a dimension to the quantitative relationships investigated above. While in many cases—though not all—these findings corroborate what has been presented in the preceding presentation of quantitative data, they also provide insight into possible mechanisms that may be underlying the more general relational patterns we have observed.

Student Perceptions of Settings and Supporters They Identify as Most Helpful to Their Music Learning. For students at Wes Montgomery who participated in the focus group conversation—both the Urban Academy and non-Urban Academy sessions—family members

were most frequently cited as the people who were most supportive of the student's music learning. Students' first musical experiences and inspirations were often linked to family members whether or not these family members were musically inclined themselves. Students identified family support as being the strongest contributor to their music learning, and the learning experiences they had with family—whether early on in life or later—as some of the most profound. Alex, a drummer attending high school, responded to a question about the people who have been most helpful to him in attaining his musical goals:

My family by far. Not because we're all musically inclined, [or] that we all do music as a career. It's just the fact that in my family there's a lot of support in general ... there's a lot of support from my house and a lot of love.... That alone is just a huge contribution to my want to learn music, to study music.

Responding to the same question, Mike, a saxophone player also in high school replied:

Neither of my parents are musical. They can't sing, play an instrument or anything. They couldn't play the piano to save their lives, but they both enjoy music to a great extent. My dad actually, when I was a little kid, he would always take me out to philharmonic. Just classical stuff that a little kid wouldn't usually like. And at first I didn't—but it grew on me, and that's kind of what got me here.

Whether or not family members—often parents were mentioned—were musical did not seem to be the critical quality on which their supportive influence hinged. It was a more general quality of love and support that students described as being influential. At times, family members were deeply involved in music, and this experience seemed to transfer naturally to study participants.

Howard, a guitarist and matriculated college student at Wes Montgomery, put it succinctly:

Also my parents are symphony musicians, so I grew up listening to them practice all day. And uh, started playing piano when I was about seven.

Private teachers, after parents and family members, were discussed by student participants as being instrumental in supporting their music learning. There was a recognition that learning to play an instrument or to sing required expert knowledge and guidance that students found in private instructors.

Several participants expressed that peers were particularly helpful in their music learning and in ways that were different from other supporters who carried the official mantle of “teacher.” Makana, a violinist from Hawaii, described what he had observed were ways students could learn from one another that were different from ways the same students could learn from a teacher:

Something that I noticed is peer reinforcement. Kids would often listen to the section leader, the more popular kids, more than they listen to the teacher.... A lot of kids hear it from the teacher and they are “yeah, yeah, yeah [makes dismissive sound].” But if they hear it from someone that they respect then they are like: “Whoa! I’m actually going through something like that everyone goes through. There is nothing wrong with me for going through that.”

Makana’s comment indicates that he feels students can at times identify with other students in ways they cannot with a teacher. He also suggests that the more influential a student is, the more he/or she may be listened to by peers and, in turn, the more influential he or she may be on their learning. Mike followed up on Makana’s comments this way:

I would agree with you. [The student is] supposed to listen to the teacher, but when you have a section leader or a choir leader, or anything where it's a peer-led group, that peer isn't just thrust the magic the magical staff of leadership. They have to earn that from [their peers] and it's really hard, but it's really effective too if you do it right.

Mike points out that students frequently cannot choose their teachers but they often can choose the peers they work with and learn from. For Mike, students who offer musical leadership need to earn the respect of their peers—whereas teachers assume a measure of authority just by being a teacher—and as a result, student-leaders may be uniquely qualified as educators. Therefore, according to Mike, these students can have significant and positive impacts on the learning of their peers. Howard also described peer connections as being helpful to him in his music learning:

I'd like to mention all the people I play with. That really changes how you approach music—when you start playing with people who are capable and who bring their own thing to the table. You combine it together, and you do it with more people, and I think that's probably the most important thing. Especially if you're going to do anything that's not solo performance.

Howard identifies engaging with the collective expertise and musical content knowledge of an ever-growing group of fellow musicians as important to his music learning. For Howard, the exposure to diversity of musical background and expertise is significant, as is the process of learning to integrate this diverse experience in the context of a musical ensemble and to synthesize his own learning from interactions with a diverse group of fellow musicians.

During the two focus groups, without specific prompting, participants identified all of the settings and participants listed on the student surveys as being helpful to their music learning. One type of supporter and two settings not included on the surveys were also mentioned. Participants said that “on-stage” was a key learning environment for them, in part because they could experience a live audience’s reactions to their music—the positive and not-so-positive—and use this feedback to inform their music moving forward. Maria, a guitarist and vocalist from Mexico described the process this way:

[On-stage] you’re delivering the messages you want to deliver.... If it’s a sad song and if just 1 person in 500 starts crying, you know that you’re doing it well. But if everyone is like “[makes disapproving noise],” you’re like, “OK, I’m not going to do this, I am going to do something else.”

Adam, a vocalist enrolled in high school in the United States, echoed Maria’s thoughts. “Once you’re on-stage ... you’re watching how people react to the things that you do when you’re on-stage.” Adam indicated that he learned from both the successful and less-successful experiences he had had on-stage. On-stage learning was recognized by many participants as a particularly valuable form of music learning, but students also explicitly acknowledged that these experiences were hard to come by and sometimes few and far between. Dedicated practice and listening spaces—such as practice rooms in music schools—were identified by two participants as being particularly helpful settings that fostered focus and offered helpful isolation, to work on some of the challenging particulars of a piece or to develop a musical skill.

Some students explicitly indicated that they, themselves, were supporters of their own music learning. Howard, put it this way:

At a certain point you realize that you can't really have a teacher give you everything that you want to learn, and then use the teacher as the structure and the framework for your own personal development. So I'd say that, not to be immodest, but I'd say myself as one of the highest motivating factors. I just really wanted to be able to do things that I couldn't, so I set my mind to it and I got it done.

As a college student, Howard was further along in his educational pathway than most other focus group participants, but he expressed a sentiment that was shared by some others in the groups. The kernel of his idea was that students themselves must be active participants in forging their own learning relationships and educational pathways that are rooted in their own interests and fundamental motivations.

A common thread throughout both focus groups and across multiple participants was that students did receive support for their music learning and that this support came from multiple individuals and in multiple settings. As with the survey data, there was a correlation with the type of supporter and the type of support provided. For example, students overall reported emotional and affective support coming from their home environments, while they learned instrumental or vocal technique in greater proportion from private teachers. These patterns reflected tendencies and not absolute rules. Parents sometimes provided specific instrumental guidance, and the Urban Academy offered supports to students designed to supplement the affective and emotional support students received at home. In this way, if private lessons typically provide expert and specialized mentorship, and a student does not have private lessons—maybe she cannot afford them—it is possible for her to receive this kind of support through other connections in her network. In this way, students can and did functionally substitute network components to extract the support they needed to pursue their musical goals.

Distillation of Supporter and Student Strategies to Promote Learning. Students discussed what supporters did (and could do) that they believed was most beneficial to their music learning. Participants also talked in some detail about what they themselves did (or could do) that they felt propelled them in the direction of their musical goals. I have aggregated and summarized student responses in Tables 4.7 and 4.8 below.

Table 4.7.

What Supporters Can Do to Promote Student Music Learning: The 11 F's

1. *Freedom*: create space and encourage learners to find their own voice and creative identity.
2. *Flexibility*: adapt instruction to needs of the learner.
3. *Frameworks*: offer structure and strategies for mastery of specific concepts, content, and performance abilities.
4. *Facilitation*: nurture and stimulate the growth of a student's music learning network by connecting students to peers, educators, performers, and others with congruent and energizing interests.
5. *Fire*: embody and transmit passion and love for music to student.
6. *Feelings*: provide emotional and affective support.
7. *Financial*: provide monetary and in-kind support for instruments, lessons, and life needs.
8. *Focus*: help student channel energy into music learning.
9. *Feedback*: provide meaningful, timely feedback to foster student music learning.
10. *Frankness*: be honest, be yourself with students. Relate meaningful personal experiences.
11. *Foster*: to nurture, promote, and protect.

Table 4.8.

What Learners Can Do to Promote Their Own Music Learning: The 10 P's

1. *Passion*: develop and nurture a genuine love for music.
2. *Persevere*: persist through ebbs and flows of personal energy level, self-doubt and self-confidence, inspiration, hardship and good fortune.
3. *Project*: cultivate and assert musical identity.
4. *Pledge*: articulate an explicit commitment to the pursuit of music.
5. *Pattern*: create and recreate rhythms of practice, study, performance, and other forms of musical engagement.
6. *Pathways*: forge learning connections with supporters and integrate and maximize learning connections in and across settings.
7. *Pleasure*: enjoy music personally and enjoy helping others.
8. *Personal reflection*: record and listen critically to your own music.
9. *Peruse*: explore new musical experiences and cultures—experiment, discover.
10. *Preserve*: take care of yourself and keep music fun.

While the lists in these tables may be read as recommendations, they are findings, in the sense that each item on the list represents a center of gravity in focus group data highlighting an area where some participants felt they identified a student-based or supporter-based strategy to support learning. I recognize that the lists are long, especially given the modest volume of interview data collected. However, I chose to include all cases where a strategy was put forward by a student (or students). They are not intended to read as rules, or established best practices, but as heuristics—offered to the reader for her consideration.

Students did offer some comments about ways they felt that teachers, specifically in formal settings, were or could be helpful. The three primary categories that emerged from the data were flexibility both in terms of genre and teaching style, relating personal experiences to students, and concretely modeling skills for students in engaging ways.

Student focus group responses were largely congruent with survey data and indicated that the learning of different musical skills were correlated with distinct kinds of supporters. For example, instrumental performance skills were often (though not always) acquired during private lessons, and early experiences with music appreciation and artistic creativity happened with family members in the home. Students talked about the ability to draw on supplemental network supporters in the event they did not receive support and resources in other, more typical areas. For example, participants in the Urban Academy reported receiving support for their academics that other students may more typically receive at home. Further, Urban Academy students indicated that they received music instruction (e.g., private lessons) and resources (instruments and books) that were more typically provided to higher-income students by their families. This amounted to a functional substitution of network roles that was brought about by an alignment of student need and the provision of targeted support and resulted in learning support for students.

Chapter 5. Findings for Research Questions 3 and 4:

Alignment, SES, and Music Learning Outcomes

Building on the descriptive and inferential work in the previous chapter, I deepen my exploration of music learning networks and examine the extent to which students believe that their musical interests are respected, valued, and represented in the settings in which they engage—and whether and how this alignment (or misalignment) may be related to music learning outcomes. In this chapter I also more closely examine differential music learning opportunities and outcomes for low- and high-SES students. As with the previous chapter, I organize Chapter 5 by research question, and within research question, by data type.

Research Question 3: Do students whose interests, motivations, and goals are aligned with the resources available to them in their learning network exhibit more positive music learning outcomes than students whose interests and motivations are out of alignment with resources available to them?

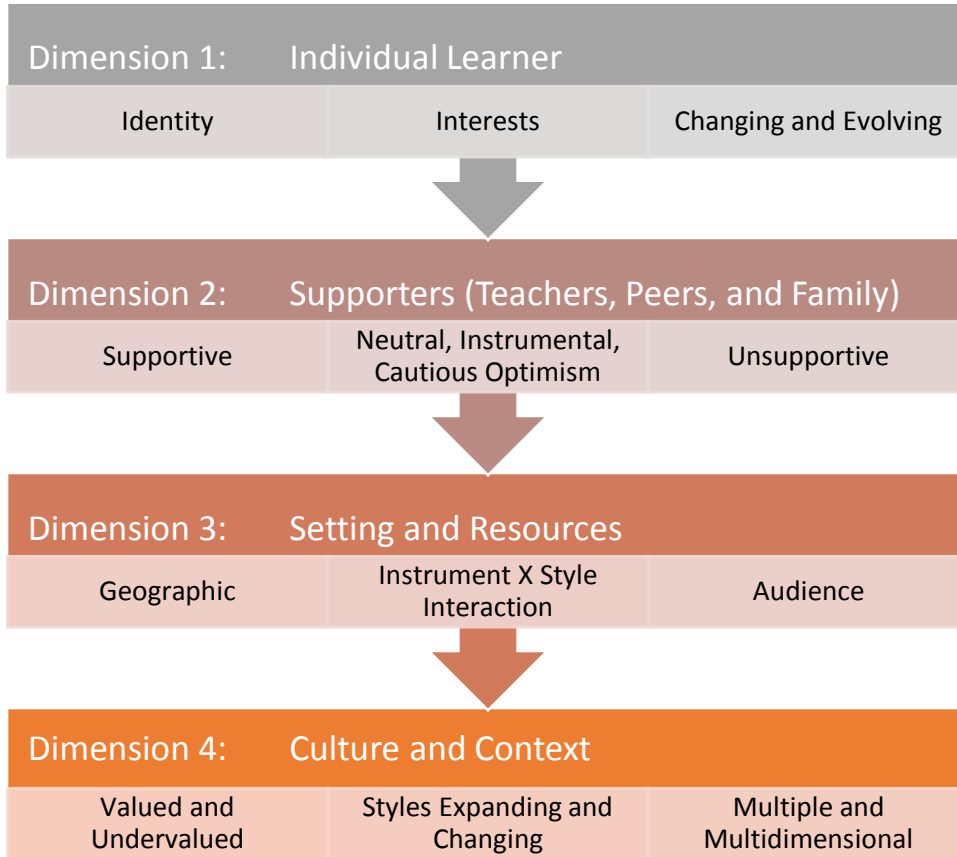
Ecological learning theory (Bell et al., 2009) asserts that alignment of a student's goals and motivations with situational resources within and across settings can promote powerful learning experiences. The purpose of the following analyses is to offer a preliminary, exploratory, and empirical investigation of this claim. I explore the concept of alignment at two levels—first, analyzing qualitative data to better understand the nature of alignment in music learning, and second, proceeding to preliminary analyses of quantitative data at student and setting levels to examine whether there may be a systematic relationship between levels of student-perceived alignment with the learning settings and resources available to them, the

overall helpfulness of these settings to students in achieving their music goals, and ultimately student music learning outcomes.

Qualitative Findings: Towards a Model of Alignment in Music Learning. A key finding—according to many students who participated in focus groups—was that alignment in music learning was a complex, multidimensional, and evolving concept. For students, the question of alignment of musical interests, goals, and identity was relevant at four primary levels: 1) within themselves, 2) with supporters and potential supporters, 3) with settings and resources in which they engage musically, and 4) with the cultures and contexts in which they participate in music making and music learning. During focus group interviews, students often indicated that the greater the alignment they felt personally with people, places, resources, and cultures in their music learning network, the more supported and successful they felt in their overall learning—but this was not always the case.

The four dimensions of alignment I identified emerged from my qualitative data analysis, and I have integrated these dimensions into a model of alignment in the music learning process. I will proceed by first presenting the full alignment model, and then describe the dimensions of alignment and link each directly to data from focus group transcripts. Figure 5.1 below summarizes the multiple levels of alignment that emerged from the qualitative data as well as qualities and attributes of each.

Figure 5.1. Music Learning Alignment Dimensions and Key Characteristics



Note: The large cell in each block of the figure contains the name of a music learning alignment dimension while the three sub-cells underneath refer to its components or characteristics.

Individual Learner: This foundational level of alignment represents students’ musical identities, interests, and motivations, and signals that these are changing and evolving over time. Students emphasized that they themselves developed over time, and that their musical interests also evolved. Some students mentioned that they strove to know themselves more thoroughly, and challenged their musical tastes and perceptions by traveling or by learning a new style of music. In this sense, alignment (within and outside of the student herself) was a moving target—the student evolved in interaction with environments that were also changing.

Supporters: This level of alignment refers to the extent to which a student’s musical goals, interests, and ambitions are supported by actors in her music learning network. Supporters (or potential supporters) in a student’s network tended to fall into one of three categories: supportive, neutral/instrumental/qualified, and unsupportive. James, a high school drummer and participant in the Urban Academy, said this of his grandmother, who he felt believed in him:

The only person who really supported me was my grandmother. She’s the one who got me my drum set and said, “Don’t let anybody get in the way of your dreams or what you want to do.” So she was like my main supporter, that’s why I’m here today.

The importance of a supporter—often a family member—supporting a student’s dreams at a critical, sometimes vulnerable moment was a theme that emerged from participant responses.

At times parents, teachers, and other important people in a student’s life were reluctant to offer support, or offered it in a qualified way. Marcelo, a high school-aged guitarist from Brazil had this to say about his father’s reaction to his interest in making music a life-long pursuit:

It took some time for [my father] to realize that [my interest in music] wasn’t a phase and it was actually what I wanted. And then when he noticed that this is what I really want to do, and this is what I love, and that this is what makes me happy, then he started ... supporting me more.... And I think that many people have no idea how much you need to learn in music, and I think that’s why people don’t usually give support as much. When they notice, when I try at least to show them that there is much more than just playing, they start understanding what I mean when I say I want to be a musician.

Others in the focus groups echoed Marcelo’s sentiment, saying that they were at times engaged in a struggle to win the hearts and minds—the support—of important people in their lives, who

could, if they chose, be supporters of the students. Ultimately, students often—but not always—reported being respected for their passion, commitment, and sacrifices in their pursuit of their musical dreams. Some students received qualified kinds of support when they indicated they wished to seriously pursue music. Teachers, for example, approved of and encouraged a student’s musical ambitions—not primarily for musical reasons—but because they felt it would benefit the student in other areas, such as college admissions. Adam, a singer who attends an elite preparatory high school, shared, with some clear disappointment, the responses of some of his teachers when he told them he wanted to pursue music professionally:

All my teachers are like “Really, you’re in an a cappella group, that’s awesome! That means you’ve got a lot more colleges that will like you.” I mean I don’t think I’ve ever had someone be like “have you ever thought of going to a college strictly for music?” ... But they’re like “oh really, Harvard has an awesome a cappella group.”

For Adam, music was only a valid pursuit in the eyes of some of his supporters to the extent it helped him in other non-music-related areas of life.

Occasionally, students talked about close people in their lives who were more clearly discouraging of their musical ambitions. James recalled his father’s and family’s reaction when he shared with them that he wanted to be a musician:

My dad wasn’t really my main supporter in music. I don’t think he really wanted me to be a musician, or I don’t know if he still does. But I guess [he’s more supportive now] because he actually saw I have some talent in music. But my dad’s from Nigeria and like, everybody in my family is like: “try to be a business man or, like a teacher or doctor.” And ... I wanted to be a musician.

Several students described reactions from members of their community that they construed as discouraging, but these types of reactions seemed to form a smaller fraction of the overall responses students received.

Considering for a moment the concept of identity—an ingredient in the music learning network framework—we can observe the ways in which students’ musical identities intersected with supporters or potential supporters in their networks. Sometimes alignment was natural—students were met with praise and encouragement when they indicated they had chosen to pursue music. Other times, responses were less than encouraging. In the latter cases, it appears that students were sometimes able, by asserting their identities in thoughtful ways, to at times bring about a positive change in family members’ or teachers’ views of their music aspirations. In cases in which potential supporters did not change, it appears this may not have a debilitating effect on focus group participants, all of whom were engaged in an active pursuit of music during the time this research was conducted. It may have been the case, however, that if critical supportive elements were missing from a student’s network, she would then need to rely more heavily on other network supporters.

Settings and Resources: Students problematized my question about alignment. I had not asked them specifically about any of the dimensions that emerged from the data. Students suggested the idea that the alignment of their musical interests with the world around them would depend on factors such as geography, nationality, and culture—as well as characteristics of the audiences they were performing for. Two students with international backgrounds—one from the Urban Academy focus group who had moved from Israel to the United States with his family, and another from the non-Urban Academy focus group who was attending the Montgomery summer program but was a permanent resident of Brazil—talked about a shift in

musical norms and values that they experienced when they crossed national boundaries. For these students, traveling to new contexts also caused a shift within them. They described being exposed to new music and experiences that excited them and stimulated them to experiment in new ways with music that they would not have otherwise. Students pointed out that within or across countries, alignment could depend on the specific interaction with a performer and the audience. Some respondents observed that audiences can differ in terms of their musical tastes, sophistication, and familiarity with particular forms of music.

The importance (or lack thereof) of an alignment of student interests with physical resources available in a network was not frequently commented on by students. Mike, a classical saxophone player, did indicate that he felt that within classical music—his preferred genre—there were few roles for saxophone. As a result, he felt he struggled at times to find meaningful roles to pursue his music in the way he wanted to.

Culture and Context (Including Musical Style and Patterns of Participation): Some students did personally identify with a musical genre or family of genres. They felt they knew which style(s) of music they wanted to play, and they also had an assessment of the ways they believed others valued that music. Some participants responded in the affirmative that the music they most enjoyed was valued, while others felt it was less valued. Adam, who most enjoyed singing country music, felt others could view the genre negatively:

Country music ... that's right now what I'm most into, and what I'm performing, and what I'm singing. And there are not many people that consider that a high quality listening music.

Makana, on the other hand, felt that the fiddle music he most liked to play—Celtic and Irish dance music—was extremely popular and well received.

The majority of respondents took issue with my framing of my questions related to the alignment of a student's preferred musical style or styles with contexts that surround them. They rejected the idea that there would be a genre or genres of music that they liked that could be either in or out of alignment with X, Y, or Z. Students explained that their identities and interests as musicians and artists were constantly evolving and changing, and that this was how they wanted it. Many indicated that they were at Montgomery so that they could further develop and change—expose themselves to different styles of music. James summarized the shared sentiment well: "I like all kinds of music. And ... my whole circle likes all kinds of music.... Nobody's really one-dimensional." He continued, "It's kinda a hard question to answer. Because especially if you consider yourself a musician, it's really a hard question to answer because music ... has so many faces."

A quote that is sometimes attributed to Louis Armstrong reframes the question of preferred musical style this way: "There's only two ways to sum up music; either it's good or it's bad." Some focus group respondents articulated similar sentiments. They talked about what they described as the universality of music. Genre, per se, was not what was most essential to them when it came to music (their own or others'). What was important was whether or not the music was any good. Leonard described it this way:

No matter what the genre is, one thing I really like about good music is that ... you recognize it. Good music you can listen to it and know that, wow, this artist or this team or group of people, this band, they put their heart and soul into it. As opposed to listening to something where you know that they just, kinda just threw it together. So I think that's

something I can respect, you know, with all genres of music is just the fact that if it's good music it's good music... You can feel it. So I don't really like to restrict myself to saying I like one type of music, you know.

James agreed. He replied to my question about which genres of music he liked to play and listen to this way:

It's kinda a hard question to answer. Because especially if you consider yourself a musician, it's really a hard question to answer because music ... has so many faces. It's so unique ... it's universal.... When I'm asked that question—"what style of music do you like?" I just like good music, you know? I enjoy good music, so, that's, that's the genre. Good music.

I do not believe that these findings resolve primarily questions regarding alignment in music learning. I feel they function primarily to pose new questions that ultimately will need to be investigated through future research.

Quantitative Findings: Exploring Relationships between Alignment, Overall Helpfulness of Music Learning Environments, and Music Learning Outcomes. In this section I attempt to leverage the survey data I have collected in two ways. First, I fit separate taxonomies of ordered probit regression models to relate the overall helpfulness of four settings (school, extracurricular, home, and informal) to students, and the degree of alignment a student perceives to exist between his/her music interests and that setting, controlling for other setting-specific covariates. Table 5.1 below summarizes the results of the regressions.

Table 5.1. Taxonomies of Ordered Probit Regression Models Predicting Overall Helpfulness of Music Learning Environments as a Function of Alignment, Controlling for Site-Specific Predictors.

	School		Extracurricular		Home		Informal	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Alignment	0.87*** (0.08)	0.55*** (0.10)	1.07*** (0.10)	0.71*** (0.13)	0.89*** (0.09)	0.59*** (0.11)	0.84*** (0.09)	0.53*** (0.11)
Time Spent	0.11* (0.05)	0.01 (0.06)	0.22*** (0.05)	0.04 (0.07)	0.20*** (0.05)	0.13* (0.06)	0.09 (0.06)	-0.06 (0.07)
Supported		0.44*** (0.12)		0.17 (0.13)		0.43*** (0.11)		0.63*** (0.13)
Resources		0.23* (0.10)		0.60*** (0.15)		0.26** (0.09)		0.14 (0.10)
Learned		0.14*** (0.04)		0.18*** (0.05)		0.08 (0.05)		0.08 (0.06)
τ_1	1.10*** (0.30)	2.25*** (0.41)	1.81*** (0.32)	2.42*** (0.42)	1.42*** (0.33)	2.46*** (0.41)	1.04*** (0.30)	1.94*** (0.40)
τ_2	1.90*** (0.31)	3.25*** (0.44)	2.77*** (0.35)	3.86*** (0.51)	2.36*** (0.33)	3.61*** (0.44)	1.82*** (0.30)	2.99*** (0.42)
τ_3	2.53*** (0.32)	4.07*** (0.47)	3.88*** (0.39)	5.42*** (0.58)	3.04*** (0.35)	4.39*** (0.48)	2.91*** (0.34)	4.36*** (0.48)
τ_4	3.99*** (0.36)	5.82*** (0.53)	5.14*** (0.44)	7.04*** (0.66)	4.57*** (0.41)	6.23*** (0.55)	4.29*** (0.38)	5.93*** (0.53)
N	230	213	185	164	217	194	194	174
Pseudo R-sq	0.25	0.33	0.35	0.47	0.26	0.36	0.24	0.33

(Standard errors in parentheses)

+ p<0.10 * p<.05 ** p<.01 *** p<.001

In Models 1-4, I explore relationships between alignment and two formal learning environments—school and structured extracurricular activities. In Models 4-8, I explore these relationships in two non-formal learning environments—home and other informal. I fit two models for each of the four settings in the table. The first model contains two covariates (in addition to the four cut points): alignment and time spent. The second model builds on the first, but three additional covariates are added: whether or not a student feels supported in a setting, his or her access to resources, and the number of skills a student reported learning in that setting. In all models, and for all settings included in the table, alignment is highly statistically

significant ($p < .001$). In all settings, alignment coefficients are largest for models with only the time-spent predictor. While the magnitude of the relationship between alignment and overall helpfulness diminishes with the inclusion of other model predictors, it remains substantial with full model alignment coefficients ranging from .53 to .71. This finding may suggest that alignment, while positively correlated with other covariates in the model, may be explaining a unique portion of the variation in the outcome, and represent a conceptually distinct factor that is positively and systematically related to overall setting helpfulness.

There is a substantial concern here with regard to construct validity. It may be the case that the alignment variable I use in the model does not accurately represent an idea of harmony between student music interest and available situational resources. Alignment could be in large part a proxy for the outcome, students having been unable to disentangle what was meant by a question related to the overall helpfulness of a setting, and the degree to which they felt their own interests are in alignment with the offerings in those settings. There is some evidence to suggest that this may be partially true. Alignment is highly correlated with overall helpfulness in all of the four included settings, with correlation coefficients ranging from .71 to .8. Correlation coefficients of other variable relationships are smaller.

I do not believe that these models by themselves provide convincing evidence for the existence of a positive and statistically significant relationship between alignment and setting helpfulness, but I include them for several reasons. The direction of the findings is aligned with insights emerging from qualitative analysis, and in this sense they are mutually reinforcing. But more important, where this model falls short, others might succeed investigating an important claim of ecological learning theory and the music learning network framework: that alignment between student interests and motivations and the situational resources available to them is an

important ingredient of the learning process. Further, I feel that seeking to investigate setting quality, by disaggregating attributes of critical learning environments and exploring them individually, may help identify important indicators of quality in learning settings.

To directly explore the relationship of alignment and music performance outcomes—and to attempt to partially address some of the concerns with the previous models—I fit a taxonomy of multiple regression models predicting music performance as a function of alignment and additional covariates culled almost entirely from the final model in Table 4.7. The new models are displayed in Table 5.2. In this modeling approach the primary quantity of interest (the alignment coefficient) and the outcome are less likely to be confounded. Music performance ability and alignment are more conceptually distinct, and in these data the variables have an uncontrolled pairwise correlation coefficient of .28. The alignment variable *totalalignment* in the models below differs from the analogous variable *alignment* in previous models, in that it represents the degree a student feels her music interests are valued, averaged across all settings in which she participates. The setting quality variable—*totalsetting2*—differs from *totalsetting* used in previous regressions only in that it does not include *alignment*, which here is modeled separately.

Table 5.2. Taxonomy of Multiple Regression Models Predicting Music Performance as a Function of Alignment, Controlling for Additional Covariates

	Model 1	Model 2	Model 3	Model 4
totalalignment	0.64*** (0.13)	0.29* (0.13)	0.24+ (0.13)	0.25+ (0.13)
totalsetting2		0.03* (0.01)	0.03* (0.01)	0.02+ (0.01)
indeg		0.19** (0.07)	0.23** (0.08)	0.23** (0.07)
locus		0.46*** (0.14)	0.38** (0.14)	0.35* (0.14)
musicmulti		0.23*** (0.04)	0.20*** (0.04)	0.19*** (0.04)
montgomery			0.62+ (0.32)	0.16 (0.39)
miles			0.53 (0.34)	0.26 (0.42)
newton			0.01 (0.32)	0.15 (0.32)
lnmonthsplaying				0.28+ (0.16)
age				0.14+ (0.08)
male				0.44* (0.22)
constant	3.06*** (0.52)	0.65 (0.65)	1.01 (0.67)	-2.17 (1.54)
N	310	347	347	347
R-sq	0.08	0.28	0.29	0.31
LL	-1010	-3681	-4047	-4961

(Standard errors in parentheses)

+ p<0.10 * p<.05 ** p<.01 *** p<.001

Model 1 includes only the total-alignment variable. Model 2 adds network, musical style, and locus of control predictors. Model 3 adds fixed effects for sites. And Model 4 (the final model) includes controls for age, gender, and prior music experience. A key result of Models 1 through 4 is that *totalalignment* is positively and significantly related to music performance—though in Models 3 and 4, the significance is modest ($=p<.1$). In Models 2 through 4, the

magnitude of the coefficient remains relatively constant after inclusion of other covariates. Comparisons to Model 1 here are problematic because it is fit using a smaller portion of the data than the following models (N=310 versus N=347). As would be expected, the magnitude and significance of the coefficients in Model 4 are very similar to those in Model 7 (the final model) presented in Table 4.6 in Chapter 4—which is identical excluding the *totalsetting* and *alignment* variables. It is interesting to note that the magnitude of the *totalsetting2* variable (.02) is practically identical—some rounding is involved—to the *totalsetting* (.02) variable in Model 7 in Table 4.6. I believe that this evidence—even given the modest statistical significance of *totalalignment* in Model 4 above—offers support for the construct validity of the *totalalignment* variable and an indication it may indeed be systematically related to music learning outcomes.

These data show—for settings included in this study—that students whose interests are in greater alignment with the situational resources available to them, on average, have higher levels of performance ability than students whose interests are less aligned with the offerings of available settings. Combining these findings with findings from qualitative analyses offers, I believe, modest support for the idea that alignment may be systematically related to multiple music learning outcomes. This finding does not answer the question of whether alignment of interests and resources promotes learning, but I argue it suggests education researchers might take up the question more directly in future research.

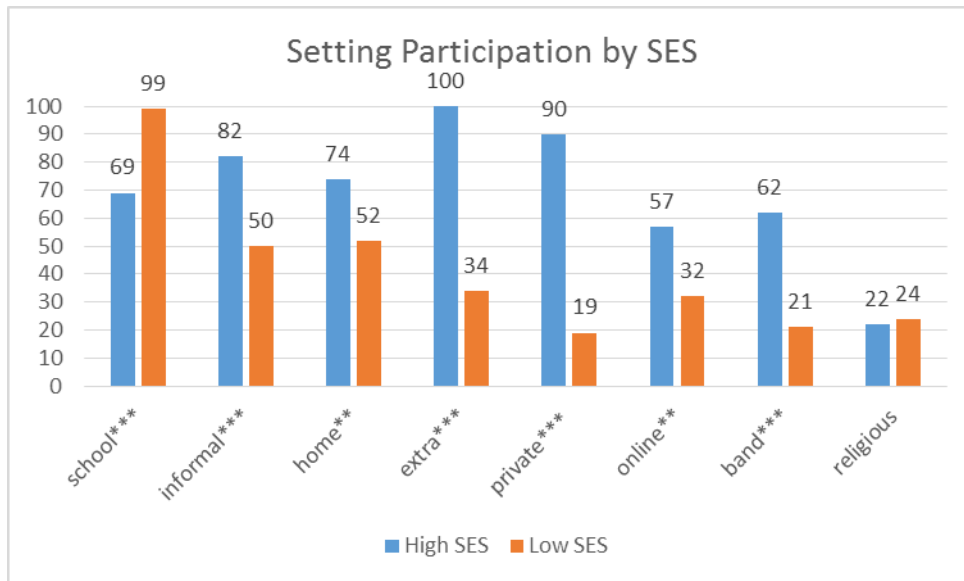
In future research, I plan to improve my alignment measure in the following way. I will attempt to document the styles of music and the music content that was in my research sites during the years I conducted this research. I will then use student data I currently have for each student to create a less perception-driven measure of alignment and explore the relationship of this new variable to students' music learning outcomes.

Research Question 4: Are the music learning networks and music learning outcomes of low-SES students different on average from those of high-SES students, and if so, in what ways?

A motivation for conducting this research was to better understand inequalities in music learning opportunities and outcomes for low-income and otherwise marginalized music students. Prior research has documented inequalities in music learning outcomes for students by race/ethnicity and SES (U.S. Department of Education, 2009; Catterall, 2009). Theoretical work flowing from multicultural education—both music-focused and more general—has underscored the need both to better understand the nature of the educational inequalities students face, and to move to address them (Banks & Banks, 2010; Anderson & Campbell 2010). Building on this prior scholarship, I will examine the data I have collected to investigate music participation of low-SES students, as well as the quality of the music learning environments they engage in.

Quantitative Findings: Participation in Music. Disaggregating survey data by SES, we see that low-SES students participate less frequently in all music learning environments specifically investigated in this study, with two exceptions—school, in which they participate more frequently (likely an artifact of study sampling approach as discussed earlier), and religious settings (in which their level of participation is statistically indistinguishable from that of high-SES students). Figure 5.2 displays the percentage participation of students across multiple learning environments. In this figure and others in this section of Chapter 5, *low-SES* will refer to students in the lowest quartile of the SES distribution, and *high-SES* will refer to students in the highest quartile.

Figure 5.2. Percentage Participation in Music Learning for Students in the Lowest and Highest Quartiles of the SES Distribution.



+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

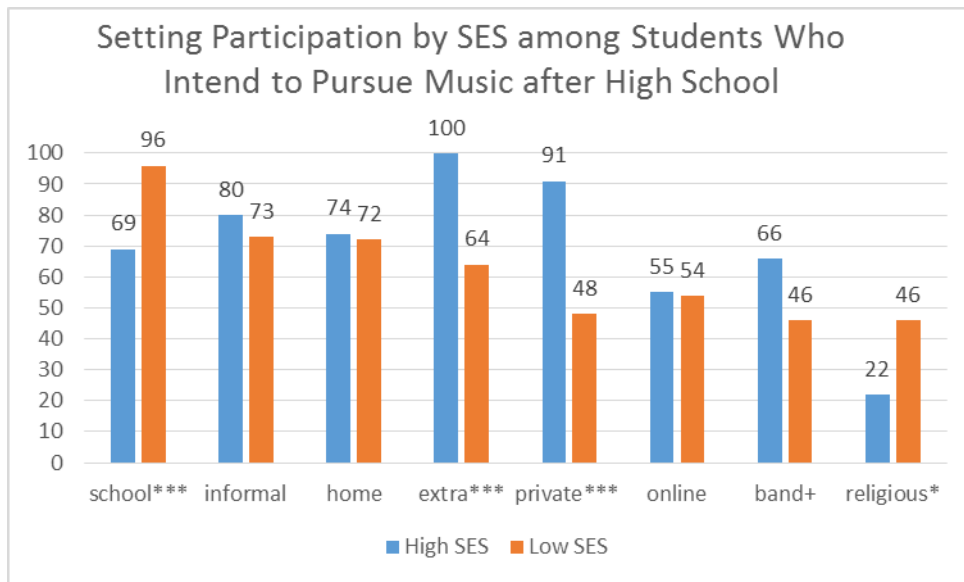
We see, with the exception of school and religious settings, that the differentials in participation between low- and high-SES students are quite large: low-SES students, it appears from these data, are engaging in music learning environments less frequently than high-SES students. In terms of overall percentage point difference, the gaps in participation are largest for structured extracurricular activities and for private lessons.

Given that in these data a larger proportion of high-SES students (92 percent) intend to pursue music after high school than low-SES students (33 percent), it may be that this difference in motivation is driving—at least in part—differences in participation. Students who intend to pursue music may be more likely to engage in music learning, irrespective of their SES. The large differences in motivation, striking in their own right, are probably explained in part by the nature of my sampling. However, exploring the development of interest in music at the earliest

stages, and how this development may differ by SES, is not directly examined in this study, and I believe represents a promising area for future research.

Figure 5.3 displays the results of a restricted comparison of music participation among only low- and high-SES students who indicate they intend to pursue music after high school.

Figure 5.3.



+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

We observe that the participation gaps narrow under this restricted comparison, they remain large and statistically significant for private lessons and structured extracurricular activities, and they are moderately significant for out-of-school bands. These findings are consistent with the notion that low-SES students in this sample who are interested in pursuing music are able to find ways to engage in learning in informal settings, at home, and online, at levels comparable to those of high-SES students. Interestingly, musically motivated low-SES students participate in music learning in religious settings with greater frequency than high-SES students. This may

mean that low-SES students in this study who were musically inclined were able to fund support for their musical pursuits in religious environments.

After examining this table, we might wonder whether participation gaps between low- and high-SES students in structured extracurricular activities and private lessons would disappear after statistical control for additional student-level covariates. To explore this possibility, I fit two taxonomies of logistic regression models predicting student participation in extracurricular activities and private lessons, including SES as the primary independent variable of interest, controlling for students' musical aspirations and a range of other covariates. Table 5.3 displays the results I obtained from fitting the regression models. The parameter estimates are in log-odds units.

Table 5.3. Results of Logistic Regression Models Predicting Student Participation in Structured Extracurricular Activities and Private Lessons as a Function of SES and other Covariates.

	Structured Extracurriculars			Private Lessons		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
ses	3.88*** (0.57)	3.09*** (0.61)	1.63* (0.80)	4.04*** (0.55)	3.33*** (0.58)	2.01** (0.75)
plansum		1.89*** (0.35)	1.78*** (0.42)		1.62*** (0.36)	1.57*** (0.42)
locus			1.05** (0.33)			0.96** (0.35)
age			-0.10 (0.14)			0.11 (0.14)
male			0.75+ (0.41)			0.53 (0.40)
grades			0.34 (0.28)			-0.29 (0.27)
black			-1.65* (0.72)			-2.09*** (0.61)
hispanic			-0.18 (1.28)			0.99 (1.14)
asian			-0.52 (1.44)			-1.88+ (1.01)
multirace			-2.33** (0.73)			-1.53* (0.59)
otherrace			-1.73 (1.06)			-1.00 (0.96)
usborn			-0.58 (0.51)			0.03 (0.49)
english			-0.46 (0.61)			-0.49 (0.57)
constant	-1.09*** (0.26)	-1.83*** (0.33)	-3.33 (2.99)	-1.83*** (0.30)	-2.55*** (0.38)	-5.28+ (3.01)
N	226	226	226	224	224	224
Pseudo R-sq	0.21	0.32	0.44	0.24	0.30	0.41
LL	-117	-102	-84	-119	-108	-91

+ p<0.10 * p<.05 ** p<.01 *** p<.001 (Standard errors in parentheses)

Models 1 through 3 predict participation in extracurriculars—Model 1 with only SES, Model 2 adding musical aspiration (plansum), and Model 3 adding age, gender, locus of control, race, and language covariates. Models 4 through 6 predict student private lessons and follow the same

pattern as Models 1-3. Diagnostics are good for both sets of nested models, with log likelihoods indicating increasing goodness of fit, and increasing pseudo R square statistics with the addition of model covariates. I do not include fixed effects for sites in these models given that SES is my primary quantity of interest and the high degree of correlation in my data between SES and research site. In my data, research site is highly correlated with SES and site fixed effects “absorb” much of the impact of SES. As I pursue this research further, I may conduct separate subgroup analyses by site, or site type, to better understand possible inter-site variation in the outcome that is separable from SES.

The main finding that I want to highlight from these models is that SES remains a statistically significant predictor of student participation in structured extracurricular and private lessons after statistical control for additional covariates, including a student’s musical aspiration, age, gender, grades, and race. Low-SES students, on average, participated in structured extracurricular activities less frequently than did high-SES students. The magnitude and pattern of the relationship between SES and participation are similar in magnitude and significance for both structured extracurricular activities and private lessons. An additional notable finding is that Black and Multiracial students, on average, also participated in private lessons and extracurricular music activities less frequently than did Whites (the reference category in these models), holding SES constant at its mean. This finding suggests that, for the populations studied, for any given level of SES and musical aspiration, Blacks are less likely to engage in private lessons or music extracurriculars than are Whites. This indicates that there may be separate SES and racial/ethnic factors that contribute to the participation gaps we observe.

Quantitative Findings: Setting Quality and What Students Learn.

The quality of the learning environments students do engage in is also important when considering educational opportunities and outcomes of students. While some research related specifically to quality in music and arts learning has been conducted (Seidel et al., 2009), my understanding is that this is a relatively underexplored area of music education research—specifically with regard to low-income or otherwise marginalized students. I have found relatively little music education research of any kind focused on these populations. Quality itself may be a predictor of a student’s choice to participate in music in a given setting. Low-quality learning environments may be less appealing to students, and as a result they could be less likely to engage in those settings. If low-SES students live in areas without high-quality music learning opportunities, this could negatively affect their participation and their learning. While I believe this is an important area for investigation, here I will pursue a different line of inquiry with regard to the quality of music learning environments: among students who do participate in music learning settings, is there variation in student perceptions of the quality of those environments by SES?

To answer this question, I use all available survey data and do not restrict the sample to only those students interested in pursuing music beyond high school. I do not think musical aspiration would be a primary influence on student perception of setting quality. Also, I would argue that for some students, learning environments—formal or informal—should be settings in which musical ambitions are formed. Whether a student aspires to be a musician or not, the learning environment in which she engages should be of high quality. We would hope she would form musical skills and abilities in that setting even if music was not her chosen career path. Consider an analogy: when examining learning in mathematics, we would not typically look only

at the learning outcomes of high school students who tell us they want to be mathematicians. A hope shared by many is that students would be learning math, even if their career goals were not fully formed, or if they feel they would rather be a writer.

Figure 5.4 shows mean levels of setting quality for each learning environment included on the survey for students from the highest and lowest SES quartiles. Quality indicators for each setting represent an average of student ratings of the following setting-specific attributes: availability of resources, alignment, enjoyment, overall helpfulness, and level of support.

Figure 5.4.



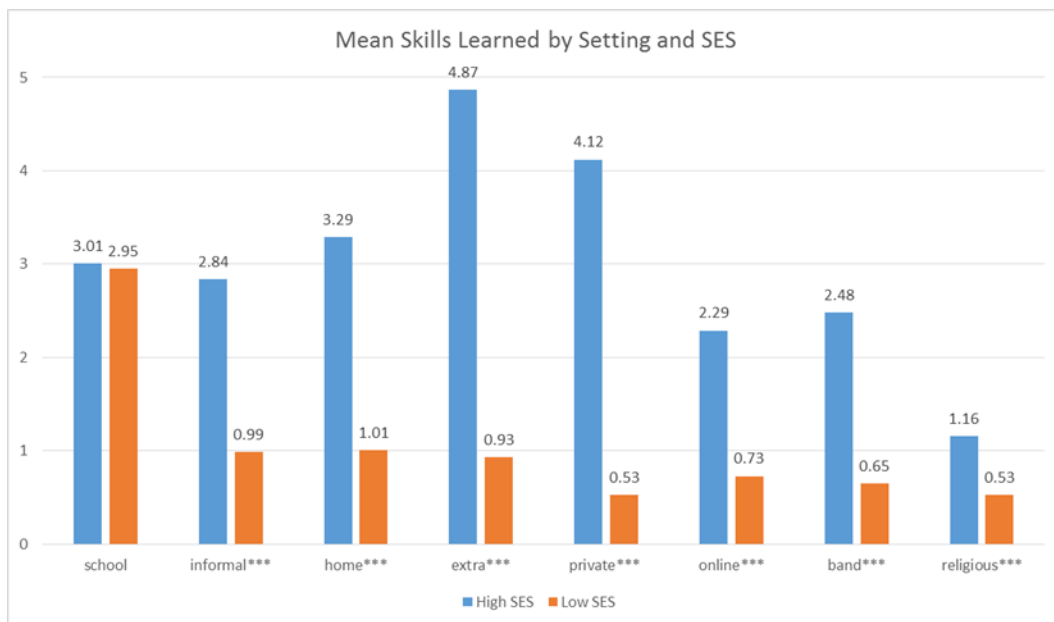
+ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Quality indicators are significantly higher for high-SES students than low-SES students in all settings except for religious institutions. The substantiate interpretation of the numbers is that low-SES students, on average, indicated that they neither agreed nor disagreed with statements

such as, “The music resources (instruments, other music equipment, music books, virtual resources, etc.) I need are available to me in school.” High-SES students, on the other hand, tended to answer in the affirmative—that resources they needed were available, that they felt supported, and so on. School environments of low- and high-SES students, while of unequal quality, were *less unequal* than other formal learning environments included on the survey—private lessons or structured extracurricular activities. This finding is consistent with the possibility that schools in this sample are in some instances (or could be) functioning as an equalizing forces with regard to low-SES music students—offering formal music instruction when private lessons or structured extracurricular activities may be unavailable or prohibitively expensive.

The number of musical skills low-SES students reported learning was significantly lower than the number high-SES students learned—in all settings except for at school. Figure 5.5 below shows the differential.

Figure 5.5.



+ p<.1, * p<.05, ** p<.01, *** p<.001

Students in both low- and high-SES groups, on average, report learning roughly three music-specific skills at school. In informal, home, extracurricular, and private lesson settings, low-SES students reported learning approximately one music skill, while high-SES students reported learning between three and five. Gaps favoring high-SES students were also present in online, after-school-band, and religious settings.

To probe these learning differentials more deeply, we will now explore which music skills low- and high-SES students reported learning in the settings they engaged in. In Chapter 4, I presented data about the different musical skills (aural/physical and theoretical/symbol-based) that students reported learning in the different settings included in the survey. I am going to present these data again here, except I now disaggregate them by lowest and highest SES quartile. Tables 5.4 through 5.6 display the data. The format of the tables is identical to that of the previous chapter: formal environment, aural/physical skill—upper-left quadrant; formal environment, theoretical/symbol-based skill—lower-left quadrant; non-formal environment, aural/physical skill—upper-right quadrant; non-formal environment, theoretical/symbol-based skill—lower-right quadrant. In Tables 5.4 and 5.5, blue cells indicate large percentages and red cells indicate smaller percentages. In Table 5.6, green cells represent smaller percentage point differences, and red cells represent larger percentage point differences.

Table 5.4.

Percentage of Students Learning Skill by Setting, High SES (N=82)								
	School	Extra	Private	Informal	Home	Online	Band	Religious
Performance	64	78	88	62	67	57	85	50
Appreciation	47	61	73	79	85	57	73	31
Creativity	36	55	68	66	79	41	63	38
Composition	36	56	50	42	54	41	53	13
Theory	62	73	78	25	35	54	33	6
Ear Training	58	73	63	25	46	57	30	30
Reading	67	80	76	11	38	39	35	19

Table 5.5.

Percentage of Students Learning Skill by Setting, Low SES (N=87)								
	School	Extra	Private	Informal	Home	Online	Band	Religious
Performance	51	48	43	22	29	14	38	32
Appreciation	39	44	43	38	18	32	38	42
Creativity	34	32	36	35	29	27	38	37
Composition	31	24	21	14	16	9	25	11
Theory	54	32	36	22	16	36	44	11
Ear Training	38	40	29	14	24	36	38	26
Reading	51	20	29	14	8	18	31	11

Looking first at Table 5.4, we notice a pattern of high-SES student skill acquisition that is similar to what we found for the whole sample (see Table 4.2): formal learning environments appear to be good places to learn aural/physical and theoretical/symbol-based skills. Non-formal learning environments may exceed formal environments for the development of physical/aural skills—appreciation and creativity—but tend not to be the settings in which theoretical/symbol-based skills are transmitted.

Moving our attention to the learning of low-SES students represented in Table 5.6, we notice that in almost every instance—across skill and setting combinations—low-SES students report learning music skills less frequently than high-SES students. Table 5.6 below displays the percentage point differences between the proportions of high-SES and low-SES students who

reported learning a skill. The uncolored cells represent differences that are not statistically significant. Colored cells represent statistically significant differences at the $p < .05$ level or above. They are color coded such that larger differences appear in red and smaller differences appear in green. On average—based upon all statistically significant differences—low-SES students reported learning music skills at levels 28 percentage points below high SES students.

Table 5.6.

Percentage Point Differences Between High-SES and Low-SES Student Learning								
	School	Extra	Private	Informal	Home	Online	Band	Religious
Performance	13	30	45	40	38	43	47	18
Appreciation	8	17	30	41	67	25	35	-11
Creativity	2	23	32	31	50	14	25	1
Composition	5	32	29	28	38	32	28	2
Theory	8	41	42	3	19	18	-11	-5
Ear Training	20	33	34	11	22	21	-8	4
Reading	16	60	47	-3	30	21	4	8

Learning differences were particularly pronounced when it came to low-SES students' learning of aural/physical music skills in non-formal environments. A particularly revealing statistic is that 18 percent of low-SES students who engaged with music at home reported learning music appreciation skills there, while 85 percent of high-SES students reported learning music appreciation at home. I made the point earlier in Chapter 4 that formal learning environments—school, extracurriculars, and private lessons—may be especially needed in order for students to acquire specific theoretical/symbol-based music skills that may be more challenging to acquire in less structured environments. Indeed, high-SES students appear to be learning these skills with high frequency in formal settings. However, fewer low-SES students who report that they participate in private lessons and extracurricular activities appear to be

learning theoretical/symbol-based music skills. For example, 20 percent of low-SES students indicate they learn to read music in music-focused structured extracurriculars, compared to 80 percent of high-SES students.

There were not statistically significant differences in skills learned for low- and high-SES students in school and in religious settings. This finding is additional evidence to support the idea that schools can serve as equalizing institutions, offering support to low-SES students who may be unable to access formal instruction elsewhere. I do want to point out that schools were not uniformly strong in their imparting of skills to students. For low- and high-SES students alike, 36 percent or less reported building creativity or composition skills in schools. This may be an area where schools in this sample might work to improve.

A final point about the data presented in Tables 5.4 through 5.6—to the extent that it is true that low-SES students may not be learning music at home or in other nonformal settings, particularly aural/physical skills, this may represent an opportunity for community-based, non-formal music spaces to reach out to low-SES students and to support their creative musical development. Qualitative findings presented in Chapter 4 run contrary to a story in which the families of low-SES students may not be providing supportive encouraging environments that stimulate curiosity and engagement with music. Almost all focus group students indicated that their families were one of their largest sources of support.

The relationships between school, family, and educational outcomes—particularly among low-SES students—are notoriously difficult to disentangle, and this study alone cannot accomplish that task. The findings that emerge are provisional and contingent and I hope will inform education research that is to come. In my future work, I plan to more fully probe these data to more thoroughly explore the ego-network structures of low- and high-SES students.

While I have conducted some preliminary analyses, these data are rich, the question complex, and future exploration is needed.

Qualitative Findings: Contrasting Low- and High-SES Students' Experiences

Learning Music. The results from my qualitative analyses suggest that the kinds of people, places, resources, and degree of cultural alignment in the music learning networks of low-income or otherwise marginalized students can be different from their more privileged peers. In the final section of this chapter, I draw from focus group data to highlight and to investigate some of these differences.

Teacher quality and instructional content were mentioned as concerns by some students in the Urban Academy focus group—concerns not mentioned in the focus group attended by non-Urban Academy students. Alex (in the Urban Academy) had this to say of some of the teachers that he, and he believes other students like him, encounter on a regular basis in high school:

Obviously in order to want to support something and to be there 100% you need to love it, and I feel that there needs to be more passionate teachers. I feel that there's a lot of teachers, and just like in general, this is in high school, you see this all the time, where they're so bored with themselves.... I'm not trying to be rude or anything, but there are so many teachers that are just sitting there, and they're so tired of themselves and ... they don't really care, and it just like—you feel exactly what they're feeling. And there's like no emotion, there's like a complete wall of nothing.

Alex continued and described what he felt was a lack of musical diversity in high school music instruction and a lack of alignment between his own interests (and those of others he knew) and the instruction they encountered:

I feel the one thing that's lacking in a lot of music studies is, just the broad study of more than just one or two styles of music. I feel like—I mean I've been home schooled for two years—but when I, um, was in high school, the only thing they taught was jazz. And not to say that's not, you need to know that stuff anyways, but there's no broad study of contemporary pop music—like modern pop music. And I feel like there is so much to learn from modern music, as much as there is from, you know, older music.

Others in the Urban Academy focus group echoed these sentiments. It did not feel to me that students in this focus group intended to be destructively critical of high school music teachers, more that they at times desired more from their instructors in terms of variety of music content, and a greater engagement and passion in the classroom.

Urban Academy students also offered specific suggestions for educators. Leonard responded this way when I asked the group what advice they might have for current or future music teachers to better support youth:

My advice for anybody, for anything that you support, obviously you support it for personal reasons, but I feel that if you're going to support something, especially something as serious as music, I think that you have to love it. You know what I mean? That's the only real way that you can like, I just feel like music is so, it's so—it's like a baby. It's so delicate. It's like, if it's put into the wrong hands, if it's supported by people who don't love it and they just want to, you know ... they don't really love it, I think that ... it can be used the wrong way.... [Urban Academy staff] love music that much that they're willing to dedicate their entire life to it. So I think that if you're going, with anything you support, but especially music, if you're going to support, I mean, love it.

This simple—penetrating—request struck me as cutting to some of the core of what it means to be a good educator: a genuine love and passion for our subject. The way Leonard put it resonates, “I think you have to love [music] ... it’s like a baby. It’s so delicate.” Music—like other areas of human activity we have put so much thought and work into over generations, including poetry, or physics, or medicine—is fragile, vulnerable. The teaching and learning of this content is also fragile—best handled with love and a bit of passion.

Some students in the Urban Academy focus group also mentioned that they believed that their musical skill levels—particularly when it came to music theory and reading standard musical notation—were sometimes below what they felt was expected of them in some learning environments. They explained that this mismatch could cause difficulty for them, and at times they felt they needed to work particularly hard to meet expectations. Further, some Urban Academy students mentioned that they were on occasion denied access to learning environments they wanted to participate in because they did not have the prerequisite skills. James had this to say about his difficulty learning to read music and the help and support around reading that the Urban Academy provided.

I had a problem with reading. I was first introduced to reading [music] in my [Urban Academy] network site. My teacher told me “it’s not all about playing music.” He was like, “you get more gigs, you get paid more if you know how to read” and I started learning how to read. It was just, it was difficult. Like, the process in my head, like trying to play at the same time and trying to read at the same time as I’m playing and trying to feel it at the same time. It was just really hard. Oh my god.... It was very difficult for me. And I had to keep on practicing. And I got help, I finally got over it. But that was an obstacle for me—reading.

Difficulty with music theory, reading standard notation, or access and audition challenges were mentioned as obstacles by some Urban Academy students. Students in the non-Urban Academy focus group did not mention having these difficulties. For non-Urban Academy students, the primary challenge when it came to settings seemed to be how to balance competing demands on their time, e.g., how to dedicate time to private lessons and band while also meeting high academic standards in non-music content areas as well.

Open-response text survey responses among low-SES students in the high school sites revealed that students believed lack of financial resources was a key factor in their not participating in various forms of music learning, particularly private lessons. Higher-SES students did not tend to mention financial trouble as a reason for not participating in a music learning activity that they would have otherwise participated in.

When asked about barriers to their music learning, students in both the Urban Academy and non-Urban Academy focus groups overwhelmingly talked about internal barriers as opposed to external ones—things they felt they themselves were doing (or not doing) that were holding them back. They critiqued their own performance skills and knowledge. They faulted what they felt were their own shortcomings in the learning process. They did not talk about underperforming schools, poor instruction, or the lack of resources that many in fact experienced. Findings from open-response text survey items were similar. Students described lulls in their motivation and occasionally burnout. Students sometimes doubted their fundamental abilities or were otherwise self-critical. However, in both focus groups, students communicated their resolve to overcome obstacles they faced.

Chapter Summary. Students indicated that alignment was a complex and multidimensional component of the music learning process. Qualitative data helped to make these multiple facets of alignment visible and showed that for several students, alignment was not fixed or binary—students themselves and their environments were in a state of constant flux. Regression models showed that, on average, students whose musical interests were more aligned with the settings in which they participated had higher music performance and theory abilities than students less in alignment.

Low-SES students participated less frequently in structured extracurricular activities and private lessons after statistical control for a range of covariates. The quality of most learning environments for low-SES students was, on average, lower than that of high-SES students. Across all settings—excluding school and religious institutions—low-SES students were less likely to learn many musical skills than high-SES students.

Some participants in the Urban Academy focus group described their struggles engaging with teachers who they felt were underprepared or uninterested and the challenges they faced acquiring music reading and theory skills. In addition, several Urban Academy participants discussed instances where they felt excluded from music learning environments they had hoped to participate in.

Chapter 6. Discussion

Findings and Contributions

The Music Learning Network Framework. In this research I have put forward a new theory of music learning. Resting on the foundations of three seminal theoretical frameworks—ecological learning theory (Bronfenbrenner, 1977; Bell et al., 2009), multicultural education (Banks, 2004), and social network-related scholarship (Wasserman & Faust, 1994)—I have argued that the music learning network framework may advance our collective understanding of how music learning takes place and catalyze the generation of new knowledge to better support young musicians.

Figure 6.1 displays the six dimensions of the framework: 1) learners, 2) supporters, 3) learning relationships, 4) settings and resources, 5) culture and context, and 6) equity.

Figure 6.1. Six Dimensions of the Music Learning Network Framework

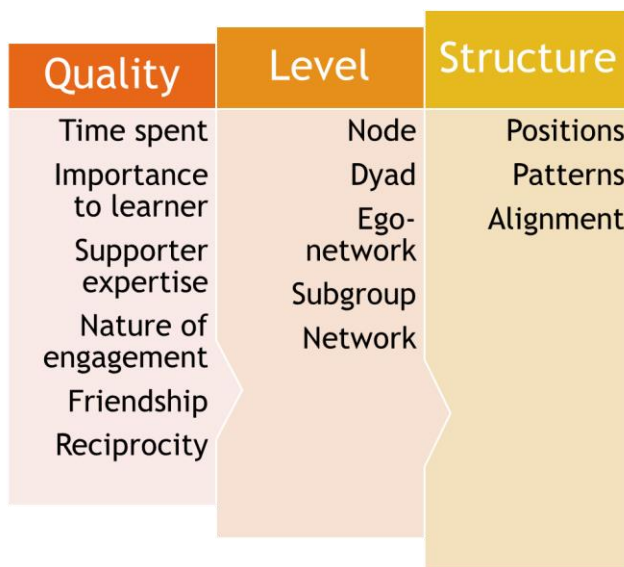


While the theory is summarized in Chapter 2, I will offer some brief reflections here. The entire framework is ecological in character. By applying it, we do not tend to focus primarily or exclusively on one learning environment (school, for example), or learning relationship (such as teacher and student), but take a step back and consider the constellation of actors, settings, and relationships that may interact—according to the theory—to support student learning in music.

Consider the relationship between the six dimensions this way: learners and supporters interact in and across settings—engaging in music making and music learning. Social network tools aid in making these interactions visible. The resulting picture that we see is—according to the framework—a representation of cultural practice. Knowing something more about the repertoires of practice (Gutiérrez & Rogoff, 2003)—patterns of musical participation among adolescents—can empower those who contribute to the education of young musicians to better support them. For example, if schoolteachers and education policymakers better understand the ways in which young people engage in music making, this knowledge can be used in the selection of curriculum content and the alignment of pedagogical practice to engage (and not frustrate) the music learning of students.

The music learning network framework emphasizes relationships, which is perhaps one of its more notable attributes. Figure 6.2 summarizes the three central features of learning relationships according to the learning network approach: 1) quality, 2) level, and 3) structure.

Figure 6.2. Three Key Features of Learning Relationships



In Chapter 4 I presented descriptive data for each research site summarizing the quality of the learning relationships present in that network (see Table 4.3). While I would argue that these data advance our knowledge about music learning network structure in these sites, a currently unanswered question is whether and how these relationships are related to learning outcomes—an area I intend to explore in the future. In this study, students were the primary unit of analysis. I made a concerted effort to tie analyses back to student-level learning outcomes. I do not regret doing so, but I need to call attention to the spaces yet unexplored. For example, at the dyad level, we may ask: what are the factors that may make the formation of a learning tie between two actors more or less likely? Ego network structure of low- and high-SES students can be more fully explored. We observed that students in Miles Davis High School tended to group together by classroom, instrument played, and race/ethnicity. With regard to music ability and SES, they tended to form more diverse groupings. There is an opportunity to explore network subgroups and the learning relationships within and between them more deeply.

Finally, I contend that analyses offered in this study provide modest support for the claim that—within the sites included in this research, and on average—network structure (as measured by indegree centrality) was systematically related to music performance ability. Students who were nominated by more peers as helpful to their peers' learning had, on average, higher levels of music ability than students who were nominated as helpful by fewer peers. As I have indicated previously, this relationship does not imply causality. It also is not proof positive that learning is somehow spreading through a network as hypothesized in the theory. An alternative hypothesis is that students of similar abilities may just be more likely to form learning ties. However, our data show that in Miles Davis High School, the music learning network we observed is diverse (or heterophilous) with regard to music ability. A case for the “influence” argument is further

supported, by the plausibility of the following scenario. We can imagine that students might indeed seek learning partners more experienced than themselves—peers who they feel have abilities beyond their own, and from whom they believe they can learn. If it is true that learning does spread through a network, and learning ties are more likely between two actors with differing levels of music ability, it is also interesting to ask whether and to what extent learning ties between more- and less-experienced musicians are mutually beneficial with regard to music learning outcomes. Less-experienced may be benefiting, but the more-experienced actor in the relationship may be benefiting as well.

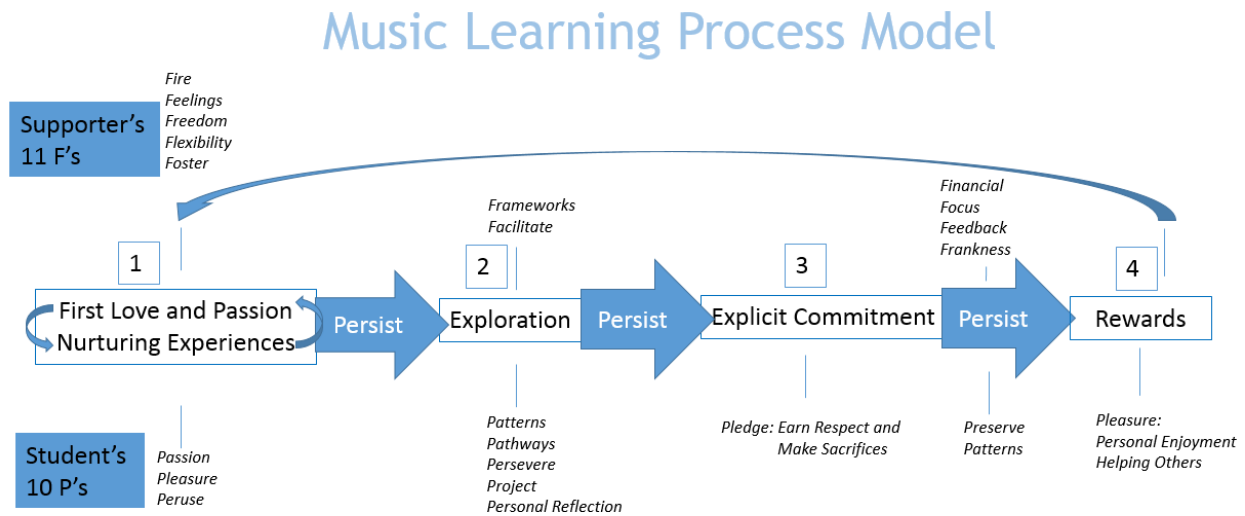
Alignment. The concept of *alignment* in music learning was the focus of the first half of Chapter 5. While alignment is not named as a separate dimension of the music learning network framework, I contend that the concept can be construed as the quality of the relationships present among the six dimensions of the theory in any given instance of its application. In other words, to what degree are a learner’s interests and motivation in music congruent with those of her supporters, the structure and resources of learning environments available to her, and the collective music-making activities of her peers in her community? I have made the argument that positive alignment among these dimensions will support student learning. Again, while not causal, I have presented site-specific and student-level evidence that suggests that—for the populations included in this sample, and on average—higher levels of alignment between students’ musical interests and situational resources in settings in which they engage are positively and significantly related to music learning outcomes. As I mentioned in Chapter 5, I believe more research is needed here—in future work I plan to rerun my models substituting a more concrete measure of alignment.

The Evolution of Music Learning Networks over Time: Towards a Model of the Music Learning Process. A limitation of this study is that it is cross-sectional. Learning involves change, and statistical methods developed to disentangle network influence tend to require multiple waves of data collection. I acknowledge this limitation and want to emphasize that longitudinal analysis is an intriguing next step for this line of research. However, I argued in Chapter 4 that the qualitative data I collected enables me, to some extent, to add a longitudinal dimension to this study. That is, through my conversations with students, I have probed the ways in which they describe the evolution of their music learning networks over time—how they forge and prune learning connections, and the nature of their perceptions about the influence of actors and settings on their development. Here, I will integrate my qualitative and quantitative data strands to offer a preliminary model of the music learning process.

I want to caution the reader here: the model I advance is speculative in many respects. While I would argue that the model does indeed emerge from and is supported by my data, I recognize that there are other models that would also be consistent with what I observed in my research. The purpose of advancing the model is to offer an educated guess about the nature of the music learning process that can function to productively inform future research. Again, let me underscore that my research design does not support statistical inference to populations not directly included in this study.

Figure 6.3 presents the music learning process model.

Figure 6.3. Music Learning Process Model



This model relies heavily on qualitative data and does not perfectly describe the learning experiences of all participants in the focus groups; rather, it captures points of convergence in my data and arrays them in a roughly chronological way. The cells in the diagram represent four key milestones that were common to many students' musical journeys, moving chronologically, across the page from left to right. Above the cells I overlay key supporter strategies (the 11 F's) that were often critical for students at each stage. The text below the cells highlights key student strategies (the 10 P's) that learners employed that helped them move in the direction of their musical goals.

Throughout the entire learning process, through all of the stages outlined above, students emphasized the three following ongoing processes they felt accompanied their journey with music: 1) selectively building a supportive music learning network, 2) persistence through life's highs and lows, 3) and maintaining a spirit of experimentation and discovery. The importance of persistence was particularly emphasized, both in relation to internal struggles—self-doubt, self-criticism, feeling overwhelmed—and external challenges—discouragement from others,

perceptions of others that music was a low-status pursuit, and competing demands on time. The message students conveyed, and wished to share with others, was that persistence in the face of adversity is a necessary and powerful learning tool.

In a succinct way I will narrate the music learning story that is represented in the figure. In recalling the first experiences that drew them into music, students described either an axiomatic, irreducible interest in music that was present in their earliest memories, or an array of formative nurturing musical experiences that led to the development of an interest in music—such as a relative who played or going to live concerts. These experiences seemed to coexist in mutually reinforcing ways, and some students were unable to recall which experiences came first for them. At this stage, supporters were often family members, and students recalled being positively influenced by the passion for music that a supporter had, receiving affective support and encouragement, and being offered the freedom and flexibility to explore and cultivate their musical interests. Students themselves described nurturing a nascent passion for music, the pleasures of creating sound and of expressing themselves, and the beginnings of exploration of different forms of music as being important ingredients of their learning.

In the second phase of musical development, students and supporters sought to sustain and fuel the initial sparks of interest over the inevitable ebbing and flowing of interest and the shocks and unfolding of life. At this stage, supporters were particularly helpful when they aided students in building supportive music learning connections and in exploring and engaging in a wide range of music learning environments. Further, supporters—often private teachers at this point—helped students by offering structured practice and study approaches to learn specialized performance and theory skills in a way that was sensitive to the fundamental and at times still fragile core of a student’s musical motivations and interests.

Some students in the focus groups—all of whom were enrolled in a specialized musicianship program—described a moment of realization in which they knew or decided that they wanted to pursue music either professionally or in college. Most participants discussed making an explicit and public commitment to the pursuit of music to themselves, friends, family, and teachers. This pledge was often received positively by adults in learners' lives, but occasionally was cause for alarm. Perceptions at times were that the student would be giving up a lucrative career—medicine or law, for example. The student would be choosing a pathway that supporters sometimes felt was lower in status. For some in a student's inner circle, music was somehow not regarded as a serious or respectable path in life. Many participants expressed an awareness of some of the sacrifices they would be making, financially, socially, and otherwise, to pursue music. They looked at the long practice hours that lay ahead—and some harbored uncertainty about the future.

Students did articulate resolve here—they talked about their belief that, whatever happened, they would be doing what they loved. For some, the process of articulating a professional commitment to music went hand in hand with a campaign to earn the respect—win the hearts and minds—of their parents, friends, and teachers. Students said that the important people in their lives respected, or came around to respect, both their passion and love for what they were doing and the courageous choice they were making to move in the direction of their dreams, and that they also received respect from others for the sacrifices they were making to pursue music. Supporters were particularly helpful who helped students to focus their energies on their musical trajectory, who provided honest and timely feedback, and who were themselves genuinely available to students. At this point, especially for participants in the Urban Academy, financial and in-kind support played an important supportive role. Private lessons at this stage

were almost an absolute must; instruments were needed if not already owned; music theory books needed to be purchased; and practice space had to be made available. Urban Academy participants indicated that the Urban Academy provided them with these resources and instruction that they would not otherwise have had.

Finally, students described the rewards they experienced—the fruits of their labor—both in terms of the personal pleasure they experienced in expressing themselves, knowing themselves, and creating worlds of sound and in terms of the joy they experienced in using their music in ways they believed would make the world a better place. Students talked about the joy they experienced in causing those who listened to their music to experience emotion—to feel, and to dream. Some participants expressed an interest in pursuing education themselves—a few were already teachers—and providing younger students with the opportunity to learn music. One participant in the Urban Academy said he was interested in founding an organization to provide music instruction and support for underserved students in the inner city.

The arrow from the final stage to the first stage of the diagram is intended to show that the music learning process is at times cyclical and nonlinear. Even more experienced musicians would need to come back to their basic love and passion for music, persist, explore anew, and reiterate and at times rearticulate their commitment to music, sometimes in a new form influenced by experience. While I have grouped student and supporter strategies with particular stages of musical development, I do not intend to communicate that these strategies and approaches are unique to a particular stage; rather, they represent centers of gravity in my data. All student and supporter strategies could be applied in one form or another in all stages. Also, by naming the fourth stage of the model “Rewards,” I do not mean to suggest that a beginning student would need to delay enjoyment until some distant time in the future. To the contrary,

enjoyment can and does occur in parts of all phases of the learning process. Rather, I mean to emphasize that, among the students who participated in the focus group—all of whom had made explicit commitments to music—none regretted doing so. In fact, students stated that they felt heightened senses of fulfillment later on in the music learning process. Some discussed greater personal enjoyment that stemmed from the abilities they had cultivated to build worlds with sound, and others described feeling satisfaction in helping others through music—either through teaching or performance.

Methodological Contributions.

Social Network Analysis and the Study of Learning. I hope this study can function in part as a proof of concept in terms of the application of social network analysis techniques to student learning. Based on my reading of the literature, the majority of social network analyses in the field of education have focused on teacher or administrator networks (Daly, 2010). Adaption of the methods to the study of student learning is a natural extension of these research tools. I recognize that the social network analyses I have included in this dissertation represent only a small fraction of what is currently possible given available approaches for statistical analyses of network data and available software (Wasserman & Faust, 1994; Butts, 2011; Borgatti, Everett & Freeman, 2002). In further research, I will investigate more fully the social network data I gathered during my dissertation data collection process. Much is still contained within these data that has yet to be fully explored.

At a descriptive level, networks are natural representations of the ecosystems in which students learn. Learning is a relational phenomenon. Because the application of social network analysis to learning in general, and music learning in particular, is relatively new, there is an enormous amount of work to be done on the descriptive side alone. Social network analysis

provides powerful tools that will enable researchers to make visible the cultural patterns of music learning and participation that take place. Making these patterns visible, I argue, is an important step in understanding and supporting learning and narrowing inequalities in music opportunities and outcomes. Inferential social network analysis tools allow researchers to model ways network structure influences individual learners, how individual learners influence network structure, and how these complementary processes co-evolve over time.

Mixed Methods Research Design. A mixed methods approach to the study of music learning, for my purposes, has been flexible enough to allow for the inclusion of social network analysis techniques. A mixed methods design may couple particularly well with ecological approaches that tend to focus on a broad range of phenomena and can require a mixture of quantitative and qualitative data to answer research questions. A combination of the ethnographically flavored qualitative analyses and descriptive, as well as inferential statistical techniques is rare in music education and holds potential to advance the fields of education and music education.

Music Learning Assessment. In this dissertation I developed a hybrid music learning assessment that relied on a combination of self-reports, peer-reports, and expert assessment of a student's learning in music (see Appendix A). While I do not work in assessment, I want to call attention to a few components of music learning assessment in general and the assessment I developed in particular.

Evidence to Support Music Learning Constructs. I measured six components of music learning: creating, performing, responding, music theory, ear training, and creativity. Using multiple question items per construct, I established the validity of each construct with Cronbach alpha levels of .8 and above. All creating and performing sub-questions could be meaningfully

grouped into a music performing meta-construct. All theory, responding, and ear training sub-questions could be meaningfully aggregated into a music theory meta-category. Cronbach alpha scores for both meta-constructs were above .8.

Assessment in the Field of Music Education. While there seems to be a significant degree of consensus in the literature about what is worth learning in music (U.S. Department of Education, 2008; Davidson et al., 1992; Gardner, 1996), there is less agreement about if and how these music learning outcomes should be assessed. I was not able to identify validated measures to assess the music learning outcomes I hoped to investigate in this study. My sense is that other researchers in the field also struggle here. I used what I found in terms of quality extant assessments but needed to create a significant proportion of the assessment I used. Additional work, collaboration, and consensus in this area would benefit researchers, practitioners, and policymakers.

Equity. A primary motivation for conducting this research was to investigate music achievement gaps—to explore to what extent the participation in, and quality of, music learning environments differed for students by race/ethnicity and SES. Extant research, described in Chapters 1 and 2, documents national disparities in music participation and learning (U.S. Department of Education, 2009; Catterall, 2009). According to this research, low-income and racial/ethnic minority learners tend to participate less frequently in music and to score lower (by some measures) on national assessments. Further, the research that *did not* exist also served as a motivating factor for this study. Research in music education that focuses on low-income and racial/ethnic minority students is relatively scarce.

Consistent with prior research, the data I collected show statistically significant gaps between low- and high-SES students in participation in music learning activities among students

who intend to pursue music after high school, with high-SES students participating with greater frequency across a range of settings. After statistical control for a range of additional covariates, these participation gaps remained for participation in structured extracurricular activities and private lessons. Also, even after statistical control for SES, Black and Multiracial students in my sample, on average, participated less frequently than did Whites. In addition, I describe ways in which setting quality differs by SES—an approach I have not encountered in other music education research studies. These findings, discussed in the second part of Chapter 5, reveal that many of the music learning environments that low-SES students do engage in are, on average, of lower quality than those of high-SES students.

Additional findings emerged from analysis of qualitative data. Urban Academy focus group respondents discussed challenges they had encountered with music teachers in public schools who they felt were uninterested or unengaged. They mentioned a desire to have a greater variety of music content offered as part of their high school curriculum. Some discussed specific challenges they encountered with reading music and learning music theory. More than one Urban Academy participant mentioned being denied access—through an audition process or by other means—to a music learning environment in which they had hoped to participate. None of these concerns was raised during the non-Urban Academy focus group. Further, in open-response survey items, low-SES students occasionally mentioned that lack of financial resources was a reason they felt they were unable to engage in some music learning environments—something not mentioned by high-SES students.

To be clear, the tenor of the Urban Focus group was not negative, pessimistic, or blaming. Students expressed resolve in their commitments to music and expressed gratitude to the many supporters (including public school teachers) who had helped them along the way.

When students did describe obstacles to their learning, low- and high-SES students alike overwhelmingly referred to internal struggles. They attributed their lack of progress to what they believed were personal shortcomings, and not lack of educational opportunity. However, this research makes visible gaps in educational opportunities that may systematically disadvantage low-SES students.

Equity is named as the sixth dimension of the music learning network framework. This dimension draws heavily from multicultural education theory, which positively asserts that all students should have equal opportunities to learn (Banks, 2010) and recognizes the disadvantages that low-income and racial/ethnic minority students can face as a result of historical marginalization and lower levels of social and economic resources (Banks et al., 2007). Multicultural education theory states that students from diverse socioeconomic, racial/ethnic, and cultural backgrounds should have their histories and cultural practices reflected in the learning environments they engage in. Further, multicultural education approaches challenge teachers, policymakers, and students to take action to narrow educational inequalities and to promote positive social change (Banks et al., 2004). This dimension of the framework calls on researchers to direct their attention to the music learning of low-income or otherwise marginalized students. I hope that it also provides researchers with tools to visualize the cultural practices of these students, to better understand the quality of the educational environments in which they engage, and to consider the alignment of students' identities and cultural practices with the situational resources available to them.

Provisional Implications for Practice and Policy

I believe that is fair to argue that research that does not support causal inferences—this study does not—should make no recommendations related to practice or policy. The potential

risks of doing so are even greater for studies—such as this one—that do not support statistical inference to populations not directly under study. I have decided to offer provisional recommendations here for the reason that, even in the absence of overwhelming evidence, we at times need to make decisions based on the information we have available. I ask that readers not misinterpret the recommendations I offer as rules to follow based on causal evidence, or read what is to follow as yet another social science researcher extrapolating beyond the range of his data. Beyond this point I will not overly qualify the recommendations, but they are necessarily tentative, incomplete, contingent, and dependent on the identity and needs of a particular student or supporter to which they might apply. I invite students, teachers, family members, and policymakers not directly connected with this study to also consider the recommendations and use them (or not) as they see fit—discounting them by the limitations of the generalizability of this study—to inform their own decision making.

Students. Much of the responsibility for your learning falls on your shoulders. Your identity, interests, and motivations matter. Search for these, develop them, and assert them. Your relationships with others are important; search for and connect with supporters with whom you identify and who can help you to successfully pursue your musical goals. Consider the multiple dimensions of music learning—performance, theory, ear training, composition, and so on. You may not be able to learn all you need or want to learn in one particular environment, so try to identify multiple settings in which you can learn and engage with music.

There will be hard days—sometimes hard months or years—but your own passion and commitments and the support of others in your network can help you to persist through these hard times. Explore, grow, and enjoy the process of learning. Life is more than work and struggle. You are the researcher who will most intimately know what kind of learning—

supporters, settings, practice strategies—work for you. Develop this self-knowledge actively, by experimenting with certain combinations, observing the results, and modifying as necessary.

Obstacles can be overcome—if you do not have access to people or settings that some of your peers do, you can receive that support elsewhere. It will take some ingenuity, but it is possible—persist, persevere, and prevail. Remember also that you have much to offer your peers. You can play a supportive role in their music learning, and doing so may be beneficial to you as well.

Here again are the 10 P's—strategies you can use to work towards the achievement of your musical goals.

Table 6.1.

What Learners Can Do to Promote Their Own Music Learning: The 10 P's

1. *Passion*: develop and nurture a genuine love for music.
 2. *Persevere*: persist through ebbs and flows of personal energy level, self-doubt and self-confidence, inspiration, hardship and good fortune.
 3. *Project*: cultivate and assert musical identity.
 4. *Pledge*: articulate an explicit commitment to the pursuit of music.
 5. *Pattern*: create and recreate rhythms of practice, study, performance, and other forms of musical engagement.
 6. *Pathways*: forge learning connections with supporters and integrate and maximize learning connections in and across settings.
 7. *Pleasure*: enjoy music personally and enjoy helping others.
 8. *Personal reflection*: record and listen critically to your own music.
 9. *Peruse*: explore new musical experiences and cultures—experiment, discover.
 10. *Preserve*: take care of yourself and keep music fun.
-

Supporters. You play a critical role in the music learning of those you are connected to. Music learning and engagement can be highly personal activities that draw on identities and deep interests and motivations of students. As you know, musical content is fragile—precious—and is best handled with care. Offering learners freedom and flexibility through your interactions can support the learning process by affirming learners' knowledge and values while offering room to grow. Learners enter learning environments with histories of engagement with music—

understanding these patterns of engagements and aligning content and pedagogy with them may be supportive to learners, connecting to them where they are, and valuing and recognizing who they are.

You may be particularly helpful in offering students frameworks for their musical growth—transmitting content in concentrated or refined ways in days what it could take years for a student to gain without you. To reach the highest levels, students require extraordinary teachers. Much of the nuance and practice of musical performance cannot be taught in books. At times, look beyond your own connection with the learner, attempt to understand your own limitations and the limitations of your relationship with the learner, and dedicate some time and energy to helping a student form nurturing supportive connections with others who can help to round out her musical development. If you observe that a supportive figure is missing in a student's network—perhaps you are a schoolteacher, and you are aware that a student has a troubled home environment—you may also help by offering the kinds of support that a student would have otherwise received at home. Your passion is contagious—share it fully and openly with students. Be present emotionally as well as professionally (if you are a teacher). Students describe the importance of affective support. Financial and in-kind support are also needed, particularly for students from low-SES backgrounds. Help learners to focus on their music and provide meaningful and honest feedback. Here again are the 11 F's—ways to work to support the music learning of students.

Table 6.2.

What Supporters Can Do to Promote Student Music Learning: The 11 F's

1. *Freedom*: create space and encourage learners to find their own voice and creative identity.
2. *Flexibility*: adapt instruction to needs of the learner.
3. *Frameworks*: offer structure and strategies for mastery of specific concepts, content, and performance abilities.
4. *Facilitation*: nurture and stimulate the growth of a student's music learning network by connecting students to peers, educators, performers, and others with congruent and energizing interests.
5. *Fire*: embody and transmit passion and love for music to student.
6. *Feelings*: provide emotional and affective support.
7. *Financial*: provide monetary and in-kind support for instruments, lessons, and life needs.
8. *Focus*: help student channel energy into music learning.
9. *Feedback*: provide meaningful, timely feedback to foster student music learning.
10. *Frankness*: be honest, be yourself with students. Relate meaningful personal experiences.
11. *Foster*: to nurture, promote, and protect.

In addition, I want to point out specific strategies that may be particularly useful for certain supporters.

Family Members: You may be the most critical components of a learner's network. You do not need to be a musician or music lover to support your family member who is learning music. Your support, love, and encouragement can be what matter most. Parents, providing early and inspiring musical experiences for your children can have large benefits. These can form the foundation for a learner's interest in music.

Teachers: In addition to the 11 F's, students mentioned three additional ways they felt teachers could be helpful: 1) offering flexibility both in terms of genre and teaching style—e.g., teach multiple forms of music using a variety of pedagogical teaching techniques, 2) relating personal experiences, and 3) concretely modeling skills for students in engaging ways.

Peer-Supporters: Your support matters to your peers. Even though you may be less experienced than many teachers you know, your opinion and guidance can at times matter more to your peers than the advice of professional educators or other adults. Your peers may at times

be better able to relate to you—and more open to learning with you—than with adults. Peer-supporters in leadership roles may be particularly influential, as you have earned the widespread trust and respect of your peers.

Schoolteachers and Administrators. Young musicians play multiple styles of music (an average of four in this study) and are motivated to engage in learning in settings that provide them with opportunities to play and learn about a range of different music. Consider broadening curriculum content at your school to connect with your students' large variety of musical interests. Explore the possibility of including content that aligns with student interest but also content that may not fall within the purview of students' prior experiences, that may cause them to stretch and grow.

Be attentive to the patterns of musical participation students exhibit and pay particular attention to low-income and racial/ethnic minority students who can be marginalized in the music learning process. In addition to curriculum content, consider pedagogical approaches that are in alignment with the cultural practices of music learners in your school.

Findings from this study show variation in music learning networks across schools—networks in some schools tend to be more connected than networks in other schools. Explore ways to facilitate peer learning within and especially across classrooms. Consider forging meaningful connections between in-school and out-of-school learning. These connections may be mutually reinforcing.

Schools can function as equalizing institutions, offering specialized music learning opportunities to students—particularly low-SES students—who may not have access to them elsewhere. In this way schools can play a critical role in supporting students and narrowing the music achievement gap. While data from this study suggest that schools are indeed imparting

music knowledge to low- and high-SES students alike, there is data to suggest that students may not be getting as much out of their in-school music education as they could. Consider for example that only 40 percent of students in this study who engaged in music in schools reported developing their musical creativity, and only 36 percent reported learning music composition. This finding signals that there is potential for improvement.

Ask yourself what role your school plays in students' broader music learning ecosystems and how you might help students forge connections with other settings and supporters who will enrich their music learning networks.

Inequalities in music access and quality exist and can be acute for low-SES and marginalized students. Special programs may be needed to reach and to support these learners. When reaching out to marginalized learners, examine their music learning networks. If they are missing key supports (even if these are not directly music related), consider alternative ways you might help them acquire those supports.

Policymakers. Findings from this research are congruent with other studies (discussed in Chapter 1) in showing inequalities in music learning opportunities and outcomes. Low-income and racial/ethnic minority students, on average, participate less frequently in music learning environments than White and higher-income students. The quality of the music learning environments for low-SES students is, on average, of lower quality than that of high-SES students. There can also be gaps in music learning outcomes, again with low-income and racial/ethnic minority students performing less well than White and high-income students. To support the music learning of low-income and racial/ethnic minority students, consider policies that stimulate the inclusion of curriculum content and the development of pedagogical skills in teachers that are aligned with the cultural practices of students in these communities and that

promote the integration of multiple learning environments to maximize ecological connections between them.

Narrowing Music Achievement Gaps. I want to move a bit beyond describing music educational inequalities here to consider what findings from this research might have to say about supporting the music learning of low-SES students.

Private Lessons and Structured Extracurricular Activities. For high-SES students, these are two of the most enriching music learning environments. Cost can be a barrier to participation in these activities, and the private lessons and extracurriculars that low-SES students report engaging in are less enriching than those for high-SES students. Offering targeted, high-quality, low-cost private lessons and structured extracurricular music learning activities for low-SES students holds the potential to boost student learning in music.

Non-formal Music Centers in Low-Income Communities. There is evidence in this study that suggests that low-SES students may be learning less in non-formal learning environments (key settings for the development of music performance, creativity, and appreciation skills) than high-SES students. Not all music learning (or types of music learning) takes place in structured environments. Non-formal music centers located in low-income communities could help to enrich and catalyze the creative music development of students in those communities.

Targeted Educational Programs. Converging evidence from qualitative and quantitative strands of this study suggests that low-SES students may face particular difficulty in acquiring theoretical/symbol-based musical skills: for example, reading music, or learning music theory. Findings from this study indicate that a primary reason for this may be that the learning environments in which low-SES students engage do not teach these skills. For students who wish

to pursue music beyond high school (and I would argue, even for those who do not), these can be valuable things to know. A possibility exists here to offer targeted tutoring or instruction in music theory, reading, ear training, and composition for young musicians who are not receiving this instruction elsewhere. One model could involve school–university or community–university partnerships. The Urban Academy, for example, is engaged in this effort in community-based network sites.

Future Directions Research

In many ways the analyses I have offered in this dissertation only scratch the surface of what is possible using the music learning network framework. Future research can attend to other settings and actors in the music learning network—for example, teacher-student exchanges in an online music environment. The learning network approach can be expanded to study learning in non-music-related content areas such as English or math. There is ample room for more theorizing about how the structure and quality of learning relationships may relate to learning outcomes and more empirical investigation of the importance of these structures.

I focused this analysis on the influence of network elements on individual learners. It is possible with the music learning network approach to look at the influence of network structure on groups of learners. It is also possible to consider how learner attributes might influence network structure. For example, do particular learner attributes—playing the same instrument or same style of music, say—make the formation of a learning relationship between two peers more likely than it would have been had they not played the same instrument or shared the same style of learning? If so, would this tendency contribute to a kind of bridging capital—at times bringing together students from groups (racial/ethnic, class, or language) who would otherwise be less likely to collaborate?

More sophisticated sampling approaches would support making inferences to larger populations. Experimental or quasi-experimental designs can provide evidence about a possible causal relationship between network predictors—as well as other factors—and music learning outcomes.

Generalizing the Music Learning Network Framework.

I want to take a step back and consider some of the larger meanings that emerge from my dissertation research. One broad finding is that individual learners matter—their interests, identities, and motivations. On average, students in this study did better musically when they felt that their interests, identities, and musical motivations were supported. Students explained that their musical identities and interests changed and evolved, and they sought learning experiences that were sensitive and adaptive to these changes. Students were not passive possessors of identity, interest, and motivation—they were seekers. They harnessed energy from their musical interests and passions to propel them on their musical journey—forging connections with supporters and seeking out and engaging with music in multiple places. Students also developed and refined approaches to their own learning—some said explicitly that they were aware that this was something no teacher could do for them. Students recognized the importance of self-directed learning and took to it with zest and gusto.

We are all in this together. Students need support from others. Findings from this study show that peers, teachers, and parents can all play supportive roles in a student's music learning. Students pointed to pedagogical strategies that were common across supporters but also to approaches they felt were particularly effective for teachers, peers, and family members. The broader point, I think, is that it is useful to think about the entire constellation of supporters who are active in scaffolding a student's musical journey. This perspective can be useful in

considering some of the ways a teacher, for example, might provide support. He or she could create a classroom environment that fostered peer learning connections, or could reach out to parents to stimulate and harness additional supports for students. From a student perspective, looking to peers, teachers, and family members may expand the universe of possibilities in which that student is currently operating. From a peer-supporter perspective, young people may benefit from recognizing their own potential to support their fellow students; recognition of the importance of the roles they play could empower them to be more proactive in supporting their peers. Roles may be suggestive of content and pedagogical approach, but these relationships are not deterministic—supporters may transcend or augment their role in scaffolding a learner. A teacher, for example, can provide emotional and academic support to a music student whose parents may be relatively unsupportive.

In this analysis, the quality and structure of learning relationships are systematically related to music learning outcomes. Whether or not learning relationships are present may be only one piece of the puzzle. I explored a necessarily finite number of relationship quality indicators and structural indices, and I hope this analysis motivates other education researchers to explore others.

I find in this analysis, consistent with ecological learning theory, that students learn music in and across multiple settings. Different settings tend to have different content profiles—that is, students engaging in them tend to learn specific kinds of musical skills. For example, private instruction appears to be a very valuable setting in which to acquire performance skills on an instrument or voice—more so than at home, particularly if parents do not play an instrument. Students may be more successful achieving their musical goals if they can combine learning environments in order to acquire the range of abilities and support they need to be successful.

Implications of this are somewhat complex. I do not think it is necessarily true that supporters in all settings should make an effort to provide young people with a full spectrum of musical skills. Even if this were possible, it may be more effective for some settings to be focused on transmitting the kinds of musical content they are particularly well suited to transmit. Formal learning environments, for example, may be very effective at providing students with music reading and theory skills, which students tend not to acquire in non-formal environments. Low-SES students who may not have access to the range of learning environments available to high-SES students may need to receive all of their musical training from a limited number of places. A useful implication is that public schools, for example, serving higher proportions of low-SES students may benefit music students by providing a broad spectrum of musical training that students may not be receiving in other settings. University partnerships may be particularly beneficial when forged with schools serving high proportions of low-SES students.

In this analysis, the most useful question was not whether formal or informal learning environments were better suited to support a student's learning in music. Instead, the more useful question—recognizing the existence and interrelation of both types of environments—was, how can learning experiences across both types of environments be integrated to maximize student learning in support of a student's musical goals? An implication for schools, for example, could be the active exploration or cultivation of partnerships with musicians and music-focused institutions. An implication for a private instructor could be helping a student expand her music learning network by scaffolding her in the formation of a band with her peers. The broader implication is for supporters in a setting to think beyond the setting(s) in which they primarily operate—at least occasionally—when working with students, to foster the inter-setting links that support student learning.

My hope is that this study will function as a proof of concept of the theoretical, methodological, and substantive utility of the music learning network framework. Taking a small step back, we can see that I have applied the network framework to only a small subset of settings and supporters I identified as active in a student's music learning networks (peer learning networks formed in schools). The framework can be applied within music to other settings: e. g., informal, home, extracurricular, band, and online. Learning connections can also be explored between students and teachers or students and family members. Taking a much larger step back, the learning network framework may be useful if applied to learning in areas outside of music. The settings and supporters most useful to students learning physics, for example, could be identified in a pilot study. Network data could then be collected to explore how specific relationships and connections interact to shape learning outcomes.

I believe that by some measures music may be ahead of the curve when compared to other school subjects because it is an area of human endeavor that is necessarily distributed across multiple settings—formal, informal, and virtual. Musical performances are accessible to more and more people. Expert performance is explicit, visible, and knowable—at least to a significant degree—by novices. In this way, students can begin to engage in what Lave and Wenger (1991) term *legitimate peripheral participation* relatively early, without an expensive, sophisticated, structured apparatus of external support. Musicians may also be ahead of the curve, on average, in terms of possessing the kinds of learning attitudes and dispositions that teachers, policymakers, and scholars often claim to value—creativity, inspiration, and a self-sustaining desire (and adaptive ability) to learn. This is not to say that students of medicine, for example, would lack these qualities. However, often students who choose to pursue music in college and beyond do so because they love music, and they tend not to be driven primarily by

financial or other external motivations. For these reasons, the learning settings, structures, and technologies that have evolved to support the learning and teaching of music may be of special use when applied to other areas of learning. Likewise, the learning dispositions and strategies developed by young musicians may be useful if applied in other content areas.

Driven in part by technological innovation, the learning relationships that many learners have and the settings in which they learn continue to expand. Students are increasingly making use of online and linked learning technologies. They gather and integrate information from multiple sources in myriad environments. Given this trend, and the likelihood it will continue (and perhaps accelerate), educational researchers will need theoretical and methodological tools to understand learning in these environments to better support students. For example, the learning network framework could be used to explore the virtual learning connections students form, and how the Internet (and online courses) may be better structured to support learning.

Ecological approaches may be very useful to understand and explain the evolving and expanding educational universe in which students navigate among formal, informal, and virtual learning environments. This study has demonstrated the presence of inequalities in music learning opportunities and outcomes for students. In my sample, I show that, on average, students who felt their music was valued and respected in the settings in which they engaged were doing better musically than students who felt out of alignment with the settings in which they participated. A multicultural and equity-focused perspective calls for us to not only document inequalities but to narrow them. I have argued that both efforts are needed in the field of music education, and in arts education more broadly. The music learning network framework offers tools to visualize and understand patterns of participation in music—to gain insight into the musical cultures of diverse groups. Documenting music making and music learning of low-

SES students in this way, and working to align learning environments and pedagogical strategies to support these students, holds the potential to narrow achievement gaps in music

I have been a guitarist for 23 years and a music educator for almost as long. This analysis has been informed by, and I hope not clouded by, this experience. I do not mean to represent here that learning music—or learning anything—can be reduced to a finite number of elements and relations. Music will of course retain all of her mystery and power, as will the students who engage with music while applying their creativity, inspiration, and freedom. I have offered a framework inspired by the beauty and power of music and in service of students pursuing music—as well as those who support them. I hope the value of this study will be measured in large part by the degree to which—directly or indirectly— it positively supports students in pursuit of their musical dreams and aspirations.

Appendices

Appendix A: Appleton High School Composite Survey

4/14/2016

Qualtrics Survey Software

The Music Learning Project

SURVEY SECTION ONE

Please enter your first and last name in the space below. Please write clearly and legibly.

What Appleton High School Do you Attend

Miles
 Newton
 Thoreau

In which class was this survey conducted?

B_Senior
 B_Chorus
 B_Strings
 B_Instrument
 C1
 C3
 C4
 C8
 E1
 E3
 E4
 E5
 E6

Think about the settings below where you may be learning music. For each setting where you DO NOT learn music, circle "N/A." Then rank each setting from 1 to 7, 1 being the most important, 2 being second most important, and so on. Use each number only once.

	1	2	3	4	5	6	7	N/A
High School music (all in-school music programs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Home/Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<https://login.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview>

1/18

Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other after-school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/ with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please name up to **five music STUDENTS in your high school** who have helped you the most to learn music. Music learning can mean improvements in musical performance, composition, appreciation or overall understanding of music. Please write the names in order with the most helpful student first, the second most helpful second and so on. Please write each student's first and last name clearly and legibly. If you aren't sure how to spell someones name, try your best.

Most helpful high school music student. Please clearly enter the student's first and last name in the space below. If you have not found any student to be helpful, write the word "NONE" in the space below, and skip to section two of the survey at the top of page 6.

How many hours do you spend on music with this person each week? Please bubble in your answer.

Less than 1 hour	From 1 to 2 hours	From 2 to 4 hours	From 4 to 8 hours	From 8 to 16 hours	More than 16 hours
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you usually spend more time working on or playing music with this student inside or outside of school?

In school

Outside of school

How would you describe this student's overall music ability on a scale from 1 to 10? **1=NOVICE and 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

Novice										Expert
1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you consider this student a friend?

Yes

No

Second most helpful high school music student. Please clearly enter the student's first and last name in the space below. If you have not found a second student to be helpful, write the word "NONE" in the space below, and skip to section two of the survey at the top of page 6.

Empty text input box for student name.

How many hours do you spend on music with this person each week?

- Less than 1 hour
- From 1 to 2 hours
- From 2 to 4 hours
- From 4 to 8 hours
- From 8 to 16 hours
- More than 16 hours

Do you usually spend more time working on or playing music with this student inside or outside of school?

- In school
- Outside of school

How would you describe this student's overall music ability on a scale from 1 to 10? **1=NOVICE and 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

- | | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Novice | | | | | | | | | | Expert |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Do you consider this student a friend?

- Yes
- No

Third most helpful high school music student. Please clearly enter the student's first and last name in the space below. If you have not found a third student to be helpful, write the word "NONE" in the space below, and skip to section two of the survey at the top of page 6.

Empty text input box for student name.

How many hours do you spend on music with this person each week?

- Less than 1 hour
- From 1 to 2 hours
- From 2 to 4 hours
- From 4 to 8 hours
- From 8 to 16 hours
- More than 16 hours

Do you usually spend more time working on or playing music with this student inside or outside of school?

- In school
- Outside of school

How would you describe this student's overall music ability on a scale from 1 to 10? **1=NOVICE and 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

Novice										Expert
1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you consider this student a friend?

Yes

No

Fourth most helpful high school music student. Please clearly enter the student's first and last name in the space below. If you have not found a fourth student to be helpful, write the word "NONE" in the space below, and skip to section two of the survey at the top of page 6.

How many hours do you spend on music with this person each week?

Less than 1 hour	From 1 to 2 hours	From 2 to 4 hours	From 4 to 8 hours	From 8 to 16 hours	More than 16 hours
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you usually spend more time working on or playing music with this student inside or outside of school?

In school

Outside of school

How would you describe this student's overall music ability on a scale from 1 to 10? **1=NOVICE and 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

Novice										Expert
1	2	3	4	5	6	7	8	9	10	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you consider this student a friend?

Yes

No

Fifth most helpful high school music student. Please clearly enter the student's first and last name in the space below. If you have not found a fifth student to be helpful, write the word "NONE" in the space below, and skip to section two of the survey at the top of page 6.

[Empty text box]

How many hours do you spend on music with this person each week?

- Less than 1 hour
- From 1 to 2 hours
- From 2 to 4 hours
- From 4 to 8 hours
- From 8 to 16 hours
- More than 16 hours

Do you usually spend more time working on or playing music with this student inside or outside of school?

- In school
- Outside of school

How would you describe this student's overall music ability on a scale from 1 to 10? **1=NOVICE and 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

- | | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Novice | | | | | | | | | | Expert |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

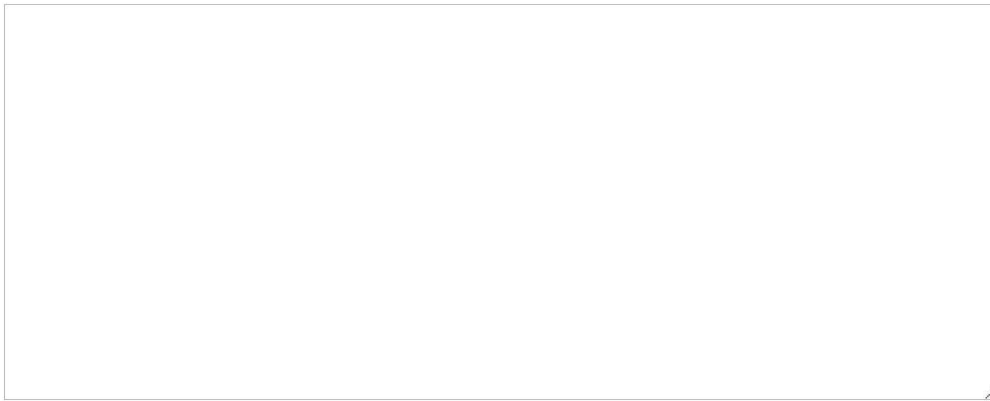
Do you consider this student a friend?

- Yes
- No

SURVEY SECTION TWO

Please list all of the music ensembles and elective courses you are currently enrolled in at your high school.

[Empty text box]



How many years have you been enrolled in the music department at your high school?

1 Year

2 Years

3 Years

4 Years

What instrument do you play in school? If you are a singer, bubble in "voice." If you play more than one instrument, fill in the bubble next to the instrument you play the most.

- Guitar
- Bass
- Drums
- Piano
- Voice
- Trumpet
- Saxophone
- Trombone
- Cello
- Violin
- Clarinet
- Flute
- Percussion
- Vibraphone
- Other (please name)

How long have you been playing your primary instrument? (Please write in the number in each space.)

Years

Months

Do you or your family own your primary instrument. If your primary instrument is voice, answer "Not Applicable."

- Yes
- No
- NotApplicable

Which styles of music do you play? Please bubble in all that apply.

- Alternative Rock
- Blues
- Classic Rock
- Classical
- Country
- Dance & Electronic
- Folk
- Hard Rock & Metal
- Jazz
- Latin
- New Age
- Pop
- R&B & Soul
- Rap & Hip-Hop
- Rock
- World Music
- Other (write in below)

How many hours per week do you spend doing the following:

	Less than 1 hour	From 1 to 2 hours	From 2 to 4 hours	From 4 to 8 hours	From 8 to 16 hours	More than 16 hours
Practicing your instrument alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Just playing (not practicing) music alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Practicing with others in a band or ensemble	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Just playing (not practicing) with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Performing for an audience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Listening to recorded music	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Composing, writing songs or creating new music	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you rate your musical ability in the following areas on a scale from 1 to 10. **A RATING OF 1=NOVICE, A RATING OF 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

	Novice 1	2	3	4	5	6	7	8	9	Expert 10
Performing for an audience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical proficiency on your instrument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presenting yourself on stage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Composing/ songwriting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improvising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpreting music written by others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Playing a song by ear on your instrument after hearing a recording or performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you rate your musical ability in the following areas on a scale from 1 to 10. **A RATING OF 1=NOVICE, A RATING OF 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

	Novice 1	2	3	4	5	6	7	8	9	Expert 10
Transcribing a melody you hear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying chords or intervals after hearing them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading music notation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing music using standard notation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Music theory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critiquing music you hear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicating information about music to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much do you feel your music abilities have progressed during this school year. Selecting 1 represents no progress and selecting 10 represents enormous progress.

No Progress	1	2	3	4	5	6	7	8	9	Enormous Progress	10
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall, how able do you feel to do the following things with your music? **A SCORE OF 1=NOT ABLE. A SCORE OF 10=VERY ABLE.**

	Not Able 1	2	3	4	5	6	7	8	9	Very Able 10
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Express yourself with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be creative with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take risks with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate your level of agreement with the statements below.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am able to improve musically through my own hard work and practice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Success in achieving my musical goals is determined largely by my own actions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I try hard I can find a way to overcome obstacles to my music learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a direct connection between how much I practice and the musical skills I have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
With enough practice I can become a skilled musician.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you plan to remain enrolled in the Music Concentration at your high school next year? Seniors, please write "N/A" in the box below.

Yes
 No—write the reason in the space below.

Have you ever attended the Monk Summer Musicianship Program?

Yes
 No

Do you plan to attend the Monk Summer Musicianship Program

Yes
 Maybe
 No

Do you plan to study music at the college level?

Yes
 Maybe
 No

Do you want to be a professional musician?

Yes

- Maybe
- No

Please summarize the grades you have received in high school in your arts (music) concentration.

- Mostly A's
- Mostly B's
- Mostly C's
- Mostly D's
- Mostly below D's

Please summarize the grades you have received in high school in your academic concentration.

- Mostly A's
- Mostly B's
- Mostly C's
- Mostly D's
- Mostly below D's

Do you engage in music learning activities in the following out-of-school settings?

	Yes	No
Home/ Family	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>
Friends/ Informal	<input type="radio"/>	<input type="radio"/>

If you DO NOT learn or play music in after school settings listed below, briefly explain why. If you do learn or play music in a setting, write N/A in the box.

Home/ Family

Private music lessons (outside of school)

Band(s) (outside of school)

After school programs

Online

Friends/ Informal

Think for a minute about the settings listed below where you may be learning music. Decide which setting is the most important for your music learning, which setting is the second most important, and so on. In the box next to each setting, write the number that corresponds to how important that setting is to your music learning. Put the number 1 next to the most important, 2 next to second most important, and so on. Write N/A in the box if you do not do music at all in a particular setting.

	1=MOST important, 2=SECOND most important, etc
Home/ family	<input type="text"/>
Private music lessons (outside of school)	<input type="text"/>
Band(s) (outside of school)	<input type="text"/>
After school programs	<input type="text"/>
Online	<input type="text"/>
Religious groups	<input type="text"/>
Informal/with friends	<input type="text"/>

How many hours a week do you engage in music learning activities in the following settings? If you do not spend any time engaging musically in a setting, please select "Not applicable."

	Less than 1 hour	From 1 to 2 hours	From 2 to 4 hours	From 4 to 8 hours	From 8 to 16 hours	Over 16 hours	Not applicable
Home/ Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For each setting below please state your level of agreement. (If you do not engage musically in some of these settings, please select "Not applicable" for each setting you do not engage in)

I receive support and encouragement for learning music in the following settings.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not applicable
Family/ home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The music resources (instruments, other music equipment, music books, virtual resources etc.) I need are available to me in the following settings.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not applicable
Home/ Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The music that is most important to me is valued and recognized in the following settings.

	Strongly	Neither Agree	Strongly
--	----------	---------------	----------

	Disagree	Disagree	nor Disagree	Agree	Agree	Not applicable
Home/ Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For each setting below please state your level of agreement. (If you do not engage musically in some of these settings, please select "Not applicable" for each setting you do not engage in)

I enjoy the music learning opportunities available to me in the following settings.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not applicable
Home/ Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following settings have been helpful to me in achieving my musical goals.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not applicable
Family/ home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Private music lessons (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Band(s) (outside of school)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
After school programs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Religious groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Informal/with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What did you learn while engaging in music activities in the following settings? For each setting, bubble in all that apply.

	Performance skills on	Composing/	Reading and writing standard	Music	Self-expression/
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	your instrument	creating music	Music theory	Ear training	music notation	appreciation/enjoyment	musical creativity	Not applicable
Home/ Family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Private music lessons (outside of school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Band(s) (outside of school)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
After school programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Online	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Religious groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Informal/with friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Briefly describe your musical goals in the space below.

What is the biggest challenge you are experiencing, if any, in achieving your goals in music. Please write in you answer in the space below.

How old are you? Please write in your age in the space below.

What is your gender?

- Male
- Female

What grade are you in?

- 9th
- 10th
- 11th
- 12th

Do your parents own the home you live in?

- Yes
- No
- I don't know

What was your mother's, or the person who is most like a mother to you, highest education level?

- Some high school
- High school graduate
- Some college
- College graduate
- Master's Degree
- PhD or Professional (Lawyer, Doctor)

What was your father's, or the person who is most like a father to you, highest education level?

- Some high school
- High school graduate
- Some college
- College graduate
- Master's Degree
- PhD or Professional (Lawyer, Doctor)

Are you eligible for free or reduced-price lunch in school?

- Yes
- No
- I don't know

What country were you born in?

- United States
- Other (please write in the space below)

Are you Hispanic, Spanish, or Latino origin?

- Yes
- No

What is your race or ethnicity? (Please bubble in all that apply)

- White
- Black or African American
- American Indian or Alaskan Native
- Asian
- Native Hawaiian or Other Pacific Islander
- Other (please write in the space below)

Which language do you speak at home?

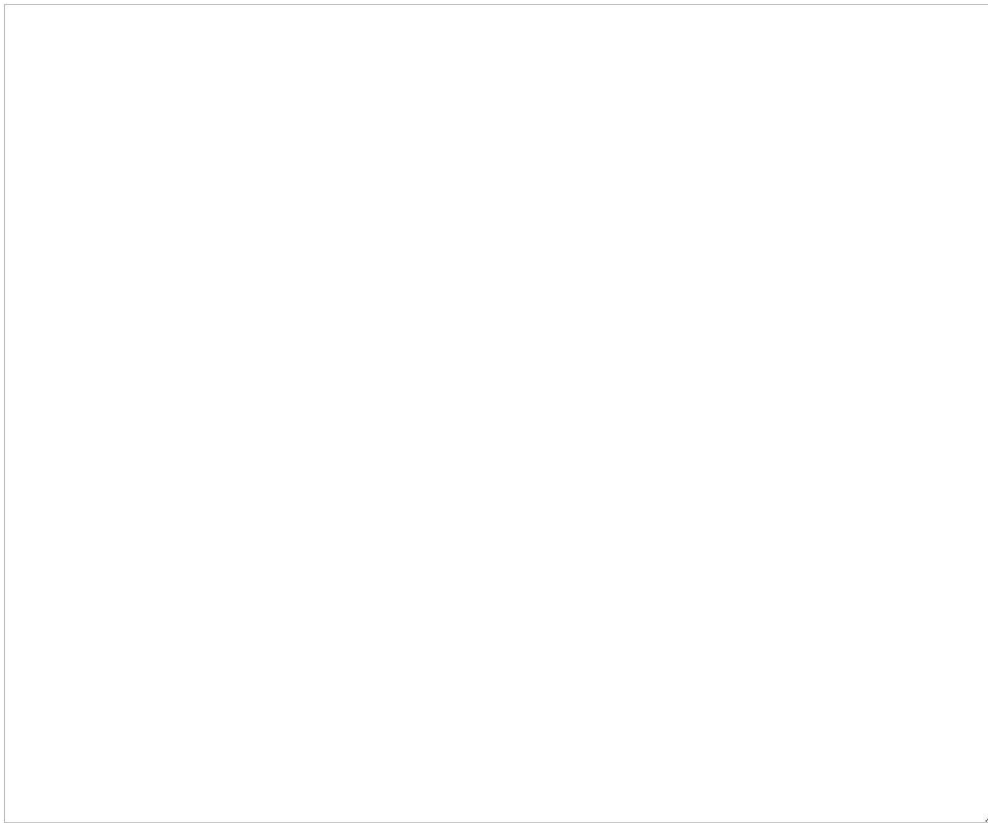
- English
- Other (please write in the space below)

Which language do you feel most comfortable using?

- English
- Other (please write in the space below)

Thank you! You have completed the survey.

If you have additional comments—or would like to share any additional information about your music learning that you weren't asked in the survey—please do so in the space below.



How would you rate this student's musical ability in the following areas on a scale from 1 to 10. **A RATING OF 1=NOVICE. A RATING OF 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

	Novice									Expert	Don't Know
	1	2	3	4	5	6	7	8	9	10	
Performing for an audience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technical proficiency on your instrument	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Presenting yourself on stage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Composing/ songwriting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improvising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpreting music written by others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Playing a song by ear on your instrument after hearing a recording or performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you rate this student's musical ability in the following areas on a scale from 1 to 10. **A RATING OF 1=NOVICE. A RATING OF 10=EXPERT.**

PLEASE REMEMBER: SELECTING "1" REPRESENTS A LOWER LEVEL OF MUSICAL ABILITY. SELECTING "10" REPRESENTS A HIGHER LEVEL OF MUSICAL ABILITY.

	Novice 1	2	3	4	5	6	7	8	9	Expert 10	Don't Know
Transcribing a melody you hear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identifying chords or intervals after hearing them	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reading music notation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing music using standard notation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Music theory	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Critiquing music you hear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Communicating information about music to others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall, how able do you feel this student is doing the following things with music? **A SCORE OF 1=NOT ABLE. A SCORE OF 10=VERY ABLE.**

	Not Able 1	2	3	4	5	6	7	8	9	Very Able 10	Don't Know
Express yourself with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be creative with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Take risks with your music.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much do you feel this student's music abilities have progressed during this school year. Selecting 1 represents no progress and selecting 10 represents enormous progress.

No Progress 1	2	3	4	5	6	7	8	9	Enormous Progress 10	Don't Know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How would you summarize this student's overall music ability on a scale from 1 to 10? 1=NOVICE and 10=EXPERT.

1	2	3	4	5	6	7	8	9	10	Don't Know
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix B: Quantitative Codebook

Variable Name	Variable Type	Variable Coding Scheme and Definitions (Also see in-text variable definitions)					
performance	<i>continuous</i>	1=Novice	10=Expert				
theory	<i>continuous</i>	1=Novice	10=Expert				
participation	<i>dichotomous</i>	0=No	1=Yes				
helpfulness	<i>categorical</i>	1=Most unhelpful	2=Moderately unhelpful	3=Neither helpful nor unhelpful	4=Moderately helpful	5=Most helpful	
alignment	<i>categorical</i>	1=Most unaligned	2=Moderately unaligned	3=Neither aligned nor unaligned	4=Moderately aligned	5=Most aligned	
timespent	<i>categorical</i>	1=<1 hour	2=1-2 hours	3=2-4 hours	4=4-8 hours	5=8-16 hours	6=>16 hours
learned	<i>categorical</i>	Number of skills learned:		0=Min	7=Max		
supported	<i>categorical</i>	1=Most unsupported	2=Moderately unsupported	3=Neither supported nor unsupported	4=Moderately supported	5=Most supported	
resources	<i>categorical</i>	1=Most resource-scarce	2=Moderately resource-scarce	3=Neither resource-scarce nor resource-rich	4=Moderately resource-rich	5=Most resource-rich	
quality	<i>continuous</i>	Average (Resources+supported+helpfulness+alignment)				Min=1	Max=5
indeg	<i>continuous</i>	0=Min	N=Max				
outdeg	<i>continuous</i>	0=Min	N=Max				
betweenness	<i>continuous</i>	0=Min	N=Max				
totalalignment	<i>continuous</i>	1=Most out of alignment	2=Moderately out of alignment	3= Neither in or out of alignment	4=Moderately in alignment	5=Most aligned	
totalse tting	<i>continuous</i>	Average (Setting numberXSetting quality)				Min=1	Max=70
totalse tting2	<i>continuous</i>	Average (Setting numberX(Setting quality-Alignment))				Min=1	Max=40
musicmulti	<i>continuous</i>	Total music styles played		Min=0	Max=15		
locus	<i>continuous</i>			1=Lowest	5=Highest		
instrument	<i>nominal</i>	Multiple indicators					
lntime total	<i>continuous</i>	Natural log of number of average hours per week playing instrument:				0=Min	4.8=Max
lnmonthsplaying	<i>continuous</i>	Natural log of number of months playing instrument:				0=Min	5.4=Max
plansum	<i>dichotomous</i>	0=No plans to pursue music in college or professionally					
		1=Plans to pursue music after high school in college, professionally, or both					

Variable Name	Variable Type	Variable Coding Scheme and Definitions (Also see in-text variable definitions)				
SES	<i>continuous</i>	0=Lowest	1=Highest			
black	<i>dichotomous</i>	0=No	1=Yes			
white	<i>dichotomous</i>	0=No	1=Yes			
asian	<i>dichotomous</i>	0=No	1=Yes			
multirace	<i>dichotomous</i>	0=No	1=Yes			
otherrace	<i>dichotomous</i>	0=No	1=Yes			
english	<i>dichotomous</i>	0=No	1=Yes			
uslive	<i>dichotomous</i>	0=No	1=Yes			
usborn	<i>dichotomous</i>	0=No	1=Yes			
montgomery	<i>dichotomous</i>	0=No	1=Yes			
miles	<i>dichotomous</i>	0=No	1=Yes			
newton	<i>dichotomous</i>	0=No	1=Yes			
thoreau	<i>dichotomous</i>	0=No	1=Yes			
grades	<i>categorical</i>	5=A's	4=B's	3=C's	2=D's	1=<D's
age	<i>continuous</i>	13=Lowest	21=Highest			
male	<i>dichotomous</i>	0=Female	1=Male			
g9--g12	<i>dichotomous</i>	0=No	1=Yes			
alterrank	<i>categorical</i>	1=Least important	5=Most important			
altertime	<i>categorical</i>	1=<1 hour	2=1-2 hours	3=2-4 hours	4=4-8 hours	5=8-16 hours 6=>16 hours
alterschool	<i>dichotomous</i>	0=Engage in school	1=Engage out of school			
alterfriend	<i>dichotomous</i>	0=Is not friend	1=Is friend			

Appendix C: Focus Group Protocol

Montgomery Summer Musicianship Program: Student Focus Group Protocol

Music Learning Project

Welcome students and thank them for their participation. Introduce PI and Montgomery staff and explain the purpose of the study. Reiterate the purpose of the focus group is to gather information about their music learning and explain that their participation is voluntary.

1. I'd like to start by asking each of you to introduce yourself. Please tell me your name, the instrument you play, and why you chose to attend the Montgomery Summer Musicianship Program.

2. Please tell me about how and when your interests in music developed.

Probe? Any special motivations or sparks of interest?

3. Who are the people who initially helped shape your understanding of and experiences with music?

4. What do the people in your life—parents, teachers, friends—say when you tell them you are seriously interested in music?

5. Tell me about the people who have been particularly helpful to you as you work to attain your musical goals, whatever those goals are. Please mention specifically who you feel has helped you the most to learn music.

Probe: How do these people help you learn? Do different kinds of people (for example teachers vs. friends) help in different ways? How so?

6. What are the settings and resources that have been most helpful to your music learning?

7. Are there settings or places where you may have wanted to engage with music but weren't able to?

8. How do you view your own role in your music learning? What, if anything, do you consider to be your responsibility?

9. What are your goals and dreams with your pursuit of music?

10. Do you believe that the kinds of music you like most, that are most important to you, are respected by others?

Probe: Teachers, parents, peers, others?

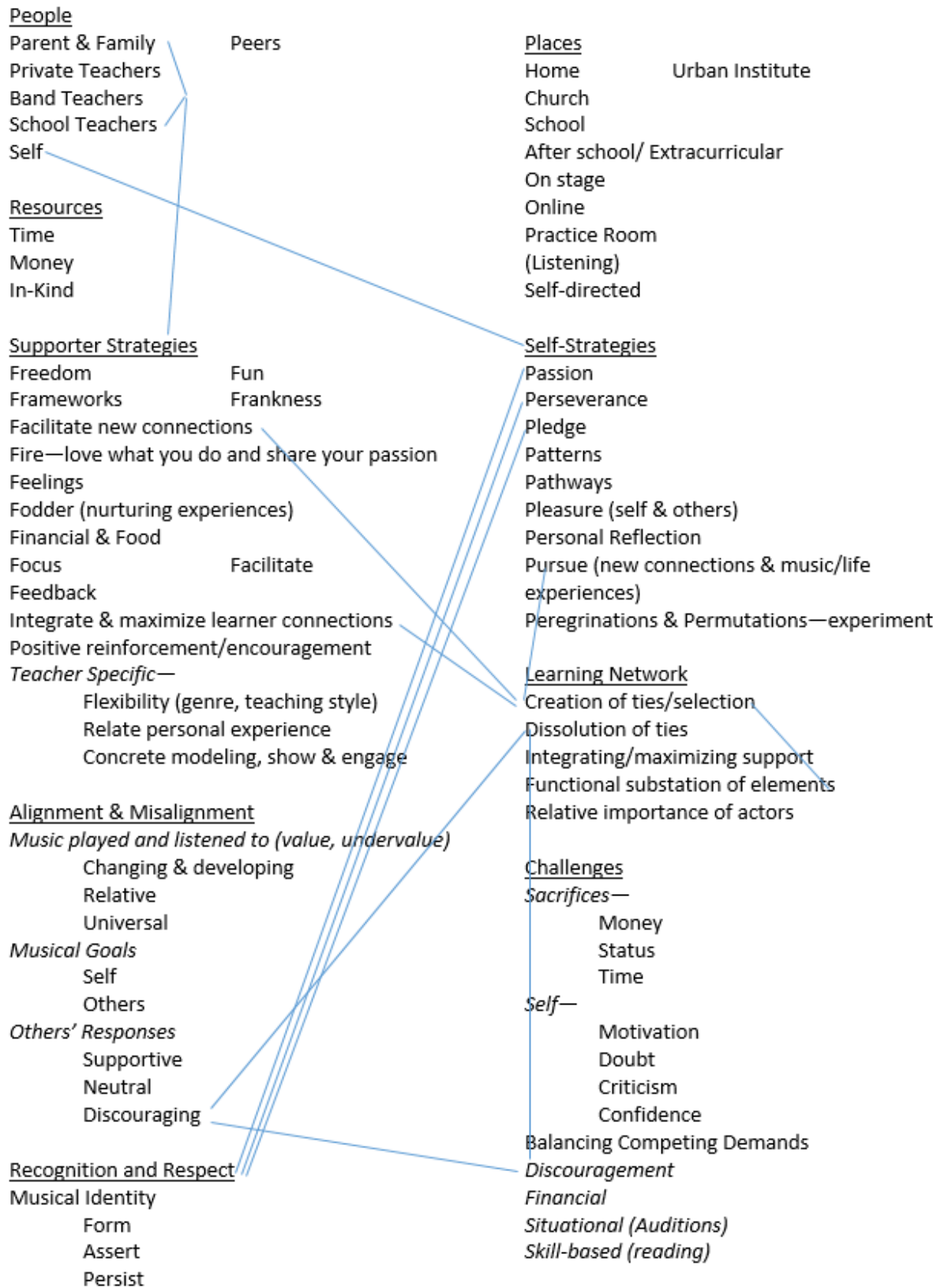
11. Have you encountered any obstacles on your musical journey—something that has made the pursuit of your goals in music more difficult? If so, please describe one or two obstacles, and talk about how you dealt (or are dealing) with it or them.

12. What advice would you give to a younger musician who is just starting on his or her musical journey that might help him or her better fulfill his or her own musical dreams?

13. What advice would you give to teachers, community members, and others about how to better support students like you who are interested in learning music?

Thank all students for their participation.

Appendix D: Qualitative Codes



Appendix E: The National Association for Music Education

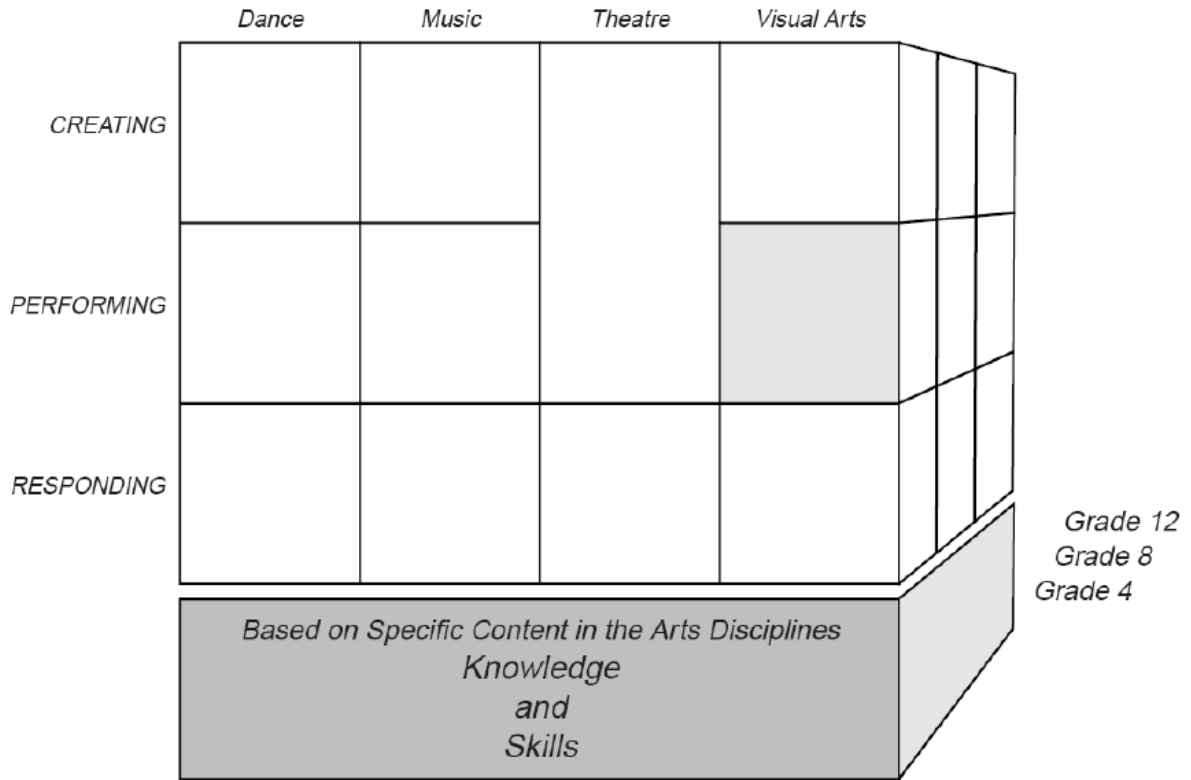
National Standards for Music Education

1. Singing, alone and with others, a varied repertoire of music.
2. Performing on instruments, alone and with others, a varied repertoire of music.
3. Improvising melodies, variations, and accompaniments.
4. Composing and arranging music within specified guidelines.
5. Reading and notating music.
6. Listening to, analyzing, and describing music.
7. Evaluating music and music performances.
8. Understanding relationships between music, the other arts, and disciplines outside the arts.
9. Understanding music in relation to history and culture.

Source: National Association for Music Education (2102). The national standards for arts education: A brief history. Retrieved November 2012 from <http://musiced.nafme.org/about/the-national-standards-for-arts-education-introduction/a-brief-history/>.

Appendix F: The National Assessment Governing Board 2008 Arts Education Assessment Framework

Exhibit 1. The framework matrix



Source: U.S. Department of Education, National Assessment Governing Board. (2008). 2008 arts education assessment framework. Washington, DC: National Assessment Governing Board, U.S. Dept. of Education.

Appendix G: The National Assessment Governing Board 1997 Art Education Assessment Framework.

Table 2.—Music Assessment Framework		
Processes		
Creating	Performing	Responding
<p>When improvising, composing, or arranging music, students:</p> <ul style="list-style-type: none"> • apply historical, cultural, and aesthetic understanding by creating stylistically appropriate alterations, variations, and improvisations; • use standard and/or non-standard notation to express original ideas; • evaluate, refine, and revise successive versions of original work; • demonstrate skill and expressiveness in the choice and use of musical elements; and • present the created work for others. 	<p>When singing or playing music with musical instruments, students:</p> <ul style="list-style-type: none"> • select appropriate repertoire; • apply skill by performing with technical accuracy; • read musical notation accurately; • evaluate, refine, and revise the performance; • develop an appropriate and expressive interpretation by applying understanding of structure and cultural and historical contexts of music; and • present the performance for others. 	<p>When perceiving, analyzing, interpreting, critiquing, and judging music, students:</p> <ul style="list-style-type: none"> • select repertoire for listening; • analyze the elements and structure of music; • compare and contrast various musical styles; • identify formal and expressive qualities that distinguish a particular style of music; • place music within its cultural and historical context; • make critical judgments about technical and expressive qualities of musical performance and compositions; and • use movement or words to interpret and describe personal responses to music.
Content		
Knowledge	Skills	
<p>Applying knowledge of:</p> <p>Context</p> <ul style="list-style-type: none"> personal social cultural historical <p>Aesthetics</p> <p>Form and structure</p> <p>Processes</p>	<p>Applying cognitive, affective, and motor skills, including:</p> <p>Perceptual</p> <p>Intellectual/Reflective</p> <p>Expressive</p> <p>Technical</p>	
SOURCE: NAEP 1997 Arts Education Assessment Framework, National Assessment Governing Board		

Source: National Center for Education Statistics. (1999). Student musical activities and achievement in music: NAEP 1997 arts assessment. Washington, DC: U.S. Dept. of Education, Office of Educational Research and Improvement. Retrieved from <http://nces.ed.gov/pubs2000/2000454.pdf>.

Appendix H: National Center for Education Statistics Student and School Survey Items

National Center for Education Statistics
NAEP 2008 Arts Student Variables
(Student Questionnaire)

NAEP ID	Label	Music Grade	Visual Arts Grade
Core Background Variables			
BA21101	Hispanic or Latino - No	8	8
BB21101	Hispanic or Latino - Mexican/Mex Amer/Chicano	8	8
BC21101	Hispanic or Latino - Puerto Rican/Puerto Ric Amer	8	8
BD21101	Hispanic or Latino - Cuban/Cuban American	8	8
BE21101	Hispanic or Latino - Other	8	8
BA21201	White (choose one or more)	8	8
BB21201	Black or African American (choose 1 or more)	8	8
BC21201	Asian (choose 1 or more)	8	8
BD21201	American Indian/Alaska Native (choose 1 or more)	8	8
BE21201	Native Hawaiian/other Pac Islldr (choose 1 or more)	8	8
B017001	Newspaper in home	8	8
B000905	Magazines in home	8	8
B013801	Books in home	8	8
B017101	Computer at home	8	8
B017201	Encyclopedia in home	8	8
B001151	Pages read in school and for homework	8	8
B017451	Talk about studies at home	8	8
B018101	Days absent from school last month	8	8
B003501	Mother's education level	8	8
B003601	Father's education level	8	8
B018201	Language other than English spoken in home	8	8
PARED	Parental education level (from 2 questions)	8	8
HISPYES	Responded yes to at least one Hispanic category	8	8
DRACEM	Race/ethnicity multiple (student-reported)	8	8
SDRACEM	Race/ethnicity (from school records)	8	8
SLUNCH	Natl School Lunch Prog eligibility (6 categories)	8	8
Music-Related Background Questions			
BM00001	I like to listen to music	8	
BM00002	I like to play music alone or with others	8	
BM00003	I think I have a talent for music	8	
BM00004	People tell me I am a good musician	8	
BM00005	I like to play music for other people	8	
BM00006	I would like to be a musician when I grow up	8	
BM00007	Music class: teacher plays music to listen to	8	
BM00008	Music class: sing	8	
BM00009	Music class: play instruments	8	
BM00010	Music class: write down music	8	
BM00011	Music class: work on group assignment	8	
BM00012	Ask you to make up your own music	8	

BM80013	Play in a band	8	
BM80014	Play in an orchestra	8	
BM80015	In school: sing in a chorus or choir	8	
BM80016	In school: take private singing lessons	8	
BM80017	In school: take private lessons on an instrument	8	
BM00019	Do you have your own musical instrument	8	
BM00020	In last year, go with class to concert	8	
BM80021	Not for school: play with a group/band/orchestra	8	
BM80022	Not for school: sing in a group/chorus/choir	8	
BM80023	Not for school: play instrument on your own	8	
BM80024	Not for school: take private lessons	8	
BM80025	Not for school: listen to a musical tape/cd/record	8	
BM80026	Not for school: enter a music competition	8	
BM80027	Not for school: go to a summer music program	8	
BM80028	Not for school: read a book about music	8	
BM80029	Not for school: watch a video/tv prog about music	8	
BM80030	Not for school: talk to family/friends about music	8	
BM80032	Heard musical performance: at school	8	
BM80033	Heard musical performance: on street/outdoors	8	
BM80034	Heard musical performance: in a theatre	8	
BM80035	Heard musical performance: on television	8	
BM80036	How hard was this test compared to other tests	8	
BM80037	How hard did you try on test comp to other tests	8	
BM80038	How import was it to you to do well on this test	8	
Visual Arts-Related Background Questions			
BV00001	I like to look at art		8
BV00002	I like to do artwork		8
BV00003	I think I have talent for art		8
BV00004	People tell me I am a good artist		8
BV00005	I like to show my artwork to other people		8
BV00006	I would like to be an artist when I grow up		8
BV00007	Taking an art course now or have this year		8
BV00008	Art class: paint or draw		8
BV00009	Art class: make things of clay/other material		8
BV00010	Art class: choose your own art project		8
BV00011	Art class: work in a pair or group		8
BV00012	Art class: talk w/others about your artwork		8
BV00013	Art class: write about your artwork		8
BV00014	Art class: videos, films, slides, TV about art		8
BV80037	Art class: use camera/computer/copier to make art		8
BV00016	How often does your teacher exhibit your artwork		8
BV00017	Ever illustrate your work in other school subjects		8
BV00018	Do you keep an art journal or sketchbook in school		8
BV00019	Do you/your teacher save your artwork in portfolio		8
BV00020	How often do you have homework for art class		8
BV00021	In last year, class visit art museum/gallery		8
BV80022	Not for school: go to an art museum or exhibit		8
BV80023	Not for school: take art classes		8
BV80024	Not for school: make artwork		8

BV80025	Not for school: exhibit your artwork		8
BV80026	Not for school: enter an art competition		8
BV80027	Not for school: go to a summer art program		8
BV80028	Not for school: look at or read a book about art		8
BV80029	Not for school: watch a video/tv program about art		8
BV80030	Not for school: talk to family/friends about art		8
BV80031	Not for school: visit an artist's studio		8
BV80032	Not for school: keep an art journal or sketchbook		8
BV80034	How hard was this test compared to other tests		8
BV80035	How hard did you try on test comp to other tests		8
BV80036	How import was it to you to do well on this test		8
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), Arts 2008, Music and Visual Arts.			

National Center for Education Statistics

**NAEP 2008 Arts School Variables
(School Questionnaire)**

NAEP ID	Label	Music Grade	Visual Arts Grade
C046201	Grade taught at this school - Pre-kindergarten	8	8
C046202	Grade taught at this school - Kindergarten	8	8
C046203	Grade taught at this school - 1st grade	8	8
C046204	Grade taught at this school - 2nd grade	8	8
C046205	Grade taught at this school - 3rd grade	8	8
C046206	Grade taught at this school - 4th grade	8	8
C046207	Grade taught at this school - 5th grade	8	8
C046208	Grade taught at this school - 6th grade	8	8
C046209	Grade taught at this school - 7th grade	8	8
C046210	Grade taught at this school - 8th grade	8	8
C046211	Grade taught at this school - 9th grade	8	8
C046212	Grade taught at this school - 10th grade	8	8
C046213	Grade taught at this school - 11th grade	8	8
C046214	Grade taught at this school - 12th grade	8	8
C051101	All students follow same calendar	8	8
C061813	Hours of instruction at grade 8 as of Feb 1, 2008	8	8
C061814	1st grp gr 8: hrs of instruction as of Feb 1, 2008	8	8
C061815	2nd grp gr 8: hrs of instruction as of Feb 1, 2008	8	8
C061816	3rd grp gr 8: hrs of instruction as of Feb 1, 2008	8	8
C038101	Current enrollment in school	8	8
C057501	Pct G8 students new in your school this yr	8	8
C057502	Pct G8 studs attending your school 1-2 yrs	8	8
C057503	Pct G8 studs attending your school 3 or more yrs	8	8
C046501	Percent enrollment identified as ELL	8	8
C045501	School type is regular middle or secondary	8	8
C045502	School type is regular with magnet program	8	8
C045503	School type is magnet or special emphasis	8	8
C045504	School type is special education	8	8
C045505	School type is alternative	8	8
C045506	School type is private independent	8	8
C045507	School type is private religious	8	8
C045508	School type is charter	8	8
C045509	School type is privately run public	8	8
C045510	School type is other	8	8
C033601	Percent absent on average day	8	8
C036501	Percent of teachers absent on average day	8	8
C037801	Percent still enrolled at end of year	8	8
C041901	Percent eighth grade held back and repeating	8	8
C038001	Full-time teachers left before end of year	8	8
C038301	School in National School Lunch Program	8	8
C051401	Operation of National School Lunch Program	8	8
C058401	Base year school distrib free lunch to students	8	8

C051601	Percent eligible National School Lunch Program	8	8
C051701	Receive Title I funding	8	8
C051801	Percent receiving targeted Title I services	8	8
C044004	Percent in gifted and talented program	8	8
C046702	Percent receiving non-English instruction	8	8
C044006	Percent receiving ESL instruction	8	8
C044007	Percent in special education	8	8
SQ00001	8th graders assigned by ability to dance class	8	8
SQ00002	8th graders assigned by ability to music class	8	8
SQ00003	8th graders assigned by ability to theatre class	8	8
SQ00004	8th graders assigned by ability to vis arts class	8	8
SQ00005	8th graders receive instruction in dance	8	8
SQ00006	8th graders receive instruction in music	8	8
SQ00007	8th graders receive instruction in theatre	8	8
SQ00008	8th graders receive instruction in visual arts	8	8
SQ00009	Computers available in classrooms	8	8
SQ00010	Computers available in separate lab	8	8
SQ00011	Computers available to bring to classroom	8	8
SQ00101	Special focus on dance	8	8
SQ00102	Special focus on music	8	8
SQ00103	Special focus on theatre	8	8
SQ00104	Special focus on visual arts	8	8
SQ00201	District or state has dance curriculum	8	8
SQ00202	District or state has music curriculum	8	8
SQ00203	District or state has theatre curriculum	8	8
SQ00204	District or state has visual arts curriculum	8	8
SQ00301	In last year, 8th grade dance field trips	8	8
SQ00302	In last year, 8th grade music field trips	8	8
SQ00303	In last year, 8th grade theatre field trips	8	8
SQ00304	In last year, 8th grade visual arts field trips	8	8
SQ00401	Extracurricular sponsored dance for 8th grade	8	8
SQ00402	Extracurricular sponsored music for 8th grade	8	8
SQ00403	Extracurricular sponsored theatre for 8th grade	8	8
SQ00404	Extracurricular sponsored vis arts for 8th grade	8	8
SQ00501	8th grade summer program in dance	8	8
SQ00502	8th grade summer program in music	8	8
SQ00503	8th grade summer program in theatre	8	8
SQ00504	8th grade summer program in visual arts	8	8
SQ00601	Full-time specialist teaches 8th grade dance	8	8
SQ00602	Part-time specialist teaches 8th grade dance	8	8
SQ00603	Physical Ed teacher teaches 8th grade dance	8	8
SQ00604	Elementary teacher teaches 8th grade dance	8	8
SQ00605	Other faculty member teaches 8th grade dance	8	8
SQ00606	Artist-in-residence teaches 8th grade dance	8	8
SQ00607	Volunteer teaches 8th grade dance	8	8
SQ00701	Full-time specialist teaches 8th grade music	8	8
SQ00702	Part-time specialist teaches 8th grade music	8	8
SQ00703	Elementary teacher teaches 8th grade music	8	8
SQ00704	Other faculty member teaches 8th grade music	8	8
SQ00705	Artist-in-residence teaches 8th grade music	8	8

SQ00706	Music volunteer teaches 8th grade music	8	8
SQ00801	Full-time specialist teaches 8th grade theatre	8	8
SQ00802	Part-time specialist teaches 8th grade theatre	8	8
SQ00803	English teacher teaches 8th grade theatre	8	8
SQ00804	Elementary teacher teaches 8th grade theatre	8	8
SQ00805	Other faculty member teaches 8th grade theatre	8	8
SQ00806	Artist-in-residence teaches 8th grade theatre	8	8
SQ00807	Volunteer teaches 8th grade theatre	8	8
SQ00901	Full-time specialist teaches 8th grade vis arts	8	8
SQ00902	Part-time specialist teaches 8th grade vis arts	8	8
SQ00903	Elementary teacher teaches 8th grade vis arts	8	8
SQ00904	Other faculty member teaches 8th grade vis arts	8	8
SQ00905	Artist-in-residence teaches 8th grade vis arts	8	8
SQ00906	Volunteer teaches 8th grade visual arts	8	8
SQ00069	Which best describes space for teaching dance	8	8
SQ00W69	Which best describes space for teaching dance	8	8
SQ00070	Which best describes space for performing music	8	8
SQ00W70	Which best describes space for performing music	8	8
SQ00071	Which best describes space for teaching theatre	8	8
SQ00W71	Which best describes space for teaching theatre	8	8
SQ00072	Which best describes space for teaching visual art	8	8
SQ00W72	Which best describes space for teaching visual art	8	8
SQ01001	In last year, any visiting artists-dance	8	8
SQ01002	In last year, any visiting artists-music	8	8
SQ01003	In last year, any visiting artists-theatre	8	8
SQ01004	In last year, any visiting artists-visual arts	8	8
SQ01101	In last year, sponsored artist prog-dance	8	8
SQ01102	In last year, sponsored artist prog-film	8	8
SQ01103	In last year, sponsored artist prog-folk arts	8	8
SQ01104	In last year, sponsored artist prog-music	8	8
SQ01105	In last year, sponsored artist prog-theatre	8	8
SQ01106	In last year, sponsored artist prog-vis art	8	8
SQ00085	Percentage of 8th graders instructed in dance	8	8
SQ00086	Percentage of 8th graders instructed in music	8	8
SQ00087	Percentage of 8th graders instructed in theatre	8	8
SQ00088	Percentage of 8th graders instructed in vis arts	8	8
CS00302	Year your school started providing instruction	8	8
CS01101	Years since charter granted	8	8
CS01201	How many times has your charter been renewed	8	8
CS01203	When was your charter most recently renewed (year)	8	8
CS02101	Years charter renewed	8	8
CS02201	School's original charter grantor	8	8
CS00201	Charter school newly created or pre-existing	8	8
CS02301	Pre-existing school was public or private	8	8
CS02701	Charter school's primary program content	8	8
CS01402	Pct new students at or above avg - 8th graders	8	8
CS01404	Percent of new eighth graders at or above average	8	8
CS01501	Participation in National School Lunch Program	8	8
CS02401	Reason do not participate Nat Sch Lunch Program	8	8

CS02801	Legal status of school	8	8
CS02501	Primary control/authority: School budget	8	8
CS02502	Primary control/authority: Supplies/equipment	8	8
CS02503	Primary control/authority: School calendar	8	8
CS02504	Primary control/authority: Student discipline	8	8
CS02505	Primary control/authority: Curriculum	8	8
CS02506	Primary control/authority: Personnel/hiring	8	8
CS02901	Areas monitored by state/agency: Curriculum	8	8
CS02902	Areas monitored by state/agency: Teaching methods	8	8
CS02903	Areas monitored by state/agency: Student achvmnt	8	8
CS02904	Areas monitored by state/agency: Student behavior	8	8
CS02905	Areas monitored by state/agency: Student attendnc	8	8
CS02906	Areas monitored by state/agency: School governance	8	8
CS02907	Areas monitored by state/agency: School finances	8	8
CS02908	Areas monitored by state/agency: Compliance w.reg	8	8
CS02909	Areas monitored by state/agency: Special ed serv	8	8
CS01006	Progress reported to State Board of Education	8	8
CS01007	Progress reported to State Department of Ed	8	8
CS01008	Progress reported to legislature	8	8
CS03201	Surveyed parents about why they chose this school	8	8
CS03301	Parents' reason-doing poorly in other school	8	8
CS03302	Parents' reason-more rigorous curriculum	8	8
CS03303	Parents' reason-school curricular focus	8	8
CS03304	Parents' reason-safer environment	8	8
CS03305	Parents' reason-greater parental involvement	8	8
CS03306	Parents' reason-smaller class sizes	8	8
CS03307	Parents' reason-other	8	8

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), Arts 2008, Music and Visual Arts.

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