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Factors influencing student continuance in instrumental music classes: A quantitative analysis

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Factors Influencing Student Continuance in Instrumental Music Classes: A Quantitative Analysis

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Dedication

For my son, Henry David Duncan, in hopes that one day, you will have access to a music education that inspires you like you have inspired me. Know that I love you fully and unconditionally.

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with a smile on your face. I love you and I hope that throughout this life, I will be able to show you the same steadfast love and dedication you have shown me.

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Abstract

In this quantitative study I investigated relationships between motivation, music aptitude, academic achievement, race, gender, and instrument type and student continuance in their first year of instrumental music study. Beginning instrumental music students (n = 30) completed the EVC Survey (Kosovich et al., 2015) to determine expectancy, value, and cost. I collected data on music aptitude, gender, race, and instrument type from teacher and school records, and conducted binary logistic regression and Chi-Square tests in order to determine predictors of continuance in instrumental music classes. I excluded gender, race, and instrument type from the logistic regression model because they did not meet assumptions. My analysis showed that expectancy, value, cost, and music aptitude significantly predicted student continuance after their first year of instrumental music instruction. Findings offer an initial model for predicting student continuance and suggest implications for future research and practice.

Keywords: motivation, music aptitude, academic achievement

Chapter One: Introduction

United States instrumental music teachers are in constant need of student enrollment to retain their jobs. When students sign up for instrumental music classes, they may try out various instruments, and complete an assessment such as the *Instrument Timbre Preference Test* (Gordon, 2008) to see at which ones they might excel or in which ones they may be interested. At the secondary level (i.e., middle, or junior high school and high school), music course offerings vary according to school size, funding, and community support (McPherson & Hendricks, 2010). Because of their elective nature, students can opt in or out of the classes after each year of curricular study.

The federal government's increased focus on reading, math, and science courses under the No Child Left Behind Act of 2001 (NCLB) forced schools to prioritize these subjects to close student achievement gaps and earn federal funding. Americans for the Arts (n.d.) reported that with Every Student Succeeds Act (ESSA) of 2015, the current policy governing United States K-12 public education, the arts and music education are specifically mentioned in the act's definition of a "well rounded education." ESSA still, however, requires testing in math and reading, carrying over some components of NCLB.

Pederson (2007) stated that, from a policy perspective, "There is less attention given to the non-tested subject areas. Those non-tested subject areas remain invisible. There is less interest in developing those areas. People are so busy with the big [tested subjects] there is no pressure to focus on fine arts, PE, or health" (p. 289). These prevailing attitudes suggest to music teachers that in order to maintain programming, funding, staffing, and perceived community value, they need to show administrators,

community members, and local government officials that students value, and are interested in, instrumental music. Perhaps the most visible way that teachers can document this interest is to recruit and retain as many students as possible.

Research on secondary school music participation indicates that from elementary schools, where participatory music classes are required, to the end of a student's secondary education, participation in music classes dwindles, largely as a result of specialized music classes like choir, band, and orchestra (Hawkinson, 2015). Hawkinson found that students had several suggestions for existing music classes, and ideas for new class offerings that might motivate more students to participate in curricular music. High school students who were, and were not, enrolled in music classes suggested extending existing ensembles to include popular music, especially in choir, and adding popular music classes, music technology classes, and world music, creative, or analytical courses into the curriculum. Williams (2012) stated that non-traditional music students, "the other 80%," were characterized by not wanting to participate in large ensembles, having a musical life outside of school, and interest in pursuing careers in music recording or the music industry. Williams suggested these students may be more interested in taking music technology classes than specialized music classes (e.g., choir, band, orchestra).

Students encounter personal, environmental, and social constraints to sustained engagement in school music classes. Students who perceive these constraints as insurmountable discontinue participation. Other authors suggest that music educators construct classroom models focused on music that is irrelevant to students' musical lives, existing only to be studied in schools, instead of engaging musical practices like arranging, composing, or improvising (Kratus, 2007; Tobias, 2013; Williams, 2011).

Gamin (2005) found that beginning instrumental student attrition rates range from 0% to 47.3%. Coupled with Hartley's (1996) finding that attrition rates are highest when students change grade levels and buildings, teachers of specialized instrumental music classes, like band or orchestra, might consider focusing on lowering attrition rates, especially after the first year of study. Perhaps one of the biggest challenges instrumental music educators face is that many programs of study are sequential and cumulative. In order to continue instrumental study, students must develop a base set of skills and knowledge necessary for subsequent participation, manifesting in prerequisite classes that make entry relatively impossible beyond the first year of study. In these circumstances, music education can be considered a closed system (Hawkinson, 2015), with policies that limit opportunities for students to study instrumental music and make classes like band and orchestra very exclusive.

Festivals and assessment events, while they are not overtly labeled as competitions, encourage comparisons among large ensembles (Moore, 2020). For example, awards such as the Virginia Music Educators Association Blue Ribbon Award and Virginia Honor Band recognize schools and teachers based on "Superior" ensemble performance. Schools whose "top" band or orchestra classes did not earn superior ratings are not recognized (VMEA, n.d.), nor are scores from developing groups considered. Additionally, large ensemble assessment processes do not measure individual student performance, but rather the final product of the group or large ensemble (Goolsby, 1999; Hash, 2013).

Focusing on large ensemble assessment may facilitate a classroom learning environment where students are dependent on the teacher for what they learn and at what

pace they learn it. In competitive climates, teachers might be inclined to choose material that would benefit their chances at winning or succeeding in competition. O'Leary (2016) suggested that teachers' self-perceptions often aligned with their group's evaluations at competitions. McPherson and Hendricks (2010) implied that there is a problem with competitive performance models and suggested that educators broaden curricula to include more self-guided music learning. Radocy (2001) posited the competitive emphasis common in U.S. school music programs could lead to restrictions in repertoire learned, limited opportunities to exclusive groups of students, and a disproportionate focus on achievement-centered instruction. Instead, teachers should be focused on creating student centered learning environments, where students are presented with authentic learning tasks, teachers base learning off of previous understanding, learners conduct their own meanings, and social interaction is a key component of the learning process (Krahenbuhl, 2016). These conclusions shed light on the divide between music being taught in instrumental music classrooms and the music students are encountering within the context of the larger culture. Rigid music programs focused on band tradition based around competitive models (Moore, 2020), rather than student-centered music learning, exclude students to their detriment.

In student-centered, or constructivist, models, content is introduced to students in an experiential way and they create their own meanings (Holsberg, 2009). While repertoire plays an integral role in band classes, it is often presented in abstract ways, making it challenging for students to construct their own meanings. Holsberg argued, though, that band repertoire is passed on because it has potential value for students. In a student-centered model, teachers must create environments where students reconstruct

meanings of repertoire through social interaction. When teachers step aside and allow for students to demonstrate what they know, it provides students the opportunity to be expressive within their musical communities and enables everyone to have a voice.

New Virginia music standards (Virginia Department of Education, 2020) open the door for teachers to focus on student-centered models, though communities, administrators, and colleagues may pressure teachers to involve their students in some degree of competitive music. While competition may be enticing to some (O'Leary, 2016), this particular brand of music education exists mainly in a vacuum. Student investment stems from agency in the learning process and, while it is certainly possible to create a student-centered learning environment (Holsberg, 2009), band teachers seldom do. In a study of choral students and motivation, Stamer (1999) stated that motivating classroom environments contain interesting repertoire, reasonable degrees of rigor, a nurturing environment, and positive feedback. However, Blocher and colleagues (1997) found that many band directors do not create classroom environments where these motivational strategies are in place.

McPherson and Hendricks (2010) found that among all school subjects, students in grades 6-12 consistently ranked music as being of least interest. When learning music outside of school, however, students in grades 6-9 ranked music as second highest of subjects by interest, and students grades 10-12 ranked music highest of all subjects by interest. Since 24% of high schoolers enroll in at least one music class (Elpus, 2020), teachers could consider this as a high ceiling when taking into account the current relevance of music education programs in the United States. if teachers were to broaden

their curricula to center around music that is most relevant to students, perhaps students would perceive increased value in curricular music.

According to a 2010 United States Department of Education report, almost all United States. secondary schools (91%) offered courses in music. Elpus (2020) found that 78% of American high schools offer at least one music class. Students are presented with new opportunities for music electives, including instrumental music, as they advance through school. These new opportunities for music learning often generate excitement to study music; however, because classes are elective in nature, students may choose to discontinue at any point (Gamin, 2005). If students elect to take music classes, educators ought to know how to motivate students and what motivates them to learn and—more importantly—want to continue learning instrumental music.

Student motivation levels influence persistence in music learning. Kratus (2007) argued that to increase curricular music courses' relevance, classroom models should shift in focus from large ensembles, centered largely around classical music that does not utilize modern-day technology, composed for instruments that are not related to a student's musical work and limit music making opportunities after graduation, to models centered around the music of modern-day culture. Other researchers have also expressed the need to examine traditional music education models to better serve students' musical interests (Heuser, 2015; Wall, 2018). In addition, McPherson and Hendricks (2010) found that there were misalignments of student views towards music as an academic subject as compared to a leisure activity. They determined that students did display a strong interest in music participation; however, not as much in an academic setting, due to low competence beliefs, value, and interest in the material.

Understanding motivational models, however, is a complex undertaking. As it relates to learning, stake holders (i.e. teachers, administrators) utilize several motivational theories. Intrinsic and extrinsic motivation theory, self-determination theory, the Attention-Relevance-Confidence-Satisfaction model, social cognitive theory, and expectancy theory are among those used in education (Gopalan et al., 2017). Each model is based on different principles with some overlap. The abundance of models makes it challenging for educators to understand and effectively utilize motivational practices to encourage students (Murphy & Alexander, 2000).

Students derive motivation from a variety of sources, both intrinsic and extrinsic (Zhang, 2014). Motivational complexity has yielded a rapidly increasing abundance of theoretical models (Murphy & Alexander, 2000). Validity of motivational models does not always apply based on academic contexts (e.g., math and music), across populations with different characteristics, or across time (Kosovich et al., 2015). Lack of reliable measures that are easy to use make it difficult for researchers and teachers to evaluate the effectiveness of motivation-boosting educational interventions.

As teachers seek to identify what sources motivate students, two common considerations include race and gender. According to Eccles (2009), collective identities, including race and gender, include beliefs about the content of behaviors, tasks, and activities associated with successful enactment of the self. Villegas and Lucas (2002) posit that the United States is currently more ethnically, racially, and linguistically diverse than ever before. Although the non-Hispanic White population was the largest racial and ethnic group as of 2015, making up around 62% of the total population, the

group is projected to make up only 44% by 2060, which would make the United States a "majority minority" nation (U.S. Census Bureau [USCB], 2015).

Students are more likely to break with stereotypical gender and racial assumptions when their communities demonstrate that cultural norms are not reflected as stereotypical expectations. Stated differently, when cultural norms differ from stereotypical suppositions, students are more likely to pursue interests without concern that they are not meeting community expectations. Due in part to continued research on the topic, students and teachers have become more aware of the negative effects of stereotypes (Eros, 2008). Sinsabaugh (2005) found that some students are willing to break traditional stereotypes surrounding instrument selection by studying twelve students, six boys and six girls, ages 11 to 16, who had broken cultural gender norms. Sinsabaugh determined which instruments were associated with each gender by referencing Abeles and Porter (1978), who found that parents and college students associated clarinet, violin, and flute with females, and drums, trumpet, and trombone with males. Among Sinsabaugh's participants, there were male students who played flute and violin, and female participants who played percussion, trumpet, and trombone. Participants who chose instruments that broke with gender stereotypes cited that their parents had played an encouraging role in their selection process. Only one participant stated that they carried their instrument openly, and both male flute players reported experiencing some type of harassment. Eros (2008), in a literature review on gender stereotypes and instrument selection, suggested that Sinsabaugh's 2005 study raises questions of how different ethnicities and gender stereotypes interact in regard to instrument selection.

Music Aptitude

Gordon (2012) wrote that "audiation itself is fundamental to student motivation" (p. 31). Audiation is the ability to hear and assign meaning to music that is not physically present or may have never been physically present. In other words, the audiation process in music is much like the thinking process in language.

To measure students' abilities to audiate, Gordon developed the *Music Aptitude Profile* (1965, 1995) as well as other music aptitude tests. Music aptitude reflects a student's potential to succeed in music. Students with high music aptitudes can discern between melodic, metric, rhythmic, harmonic, and stylistic qualities of music (1965, 1995). A number of researchers (e.g., Froseth, 1971; Kuhlman, 2005; Schleuter, 1978) have documented relationships between music aptitude and music achievement.

Gordon (2012) stated that all people have some potential to learn music and that no one should be excluded from having access to a quality music education. However, music aptitude is normally distributed among populations (Gordon, 1981). Therefore, few people have high music aptitudes, few people have low music aptitudes, and most people fall somewhere in between. Gordon does not state that having a high aptitude leads to higher levels of motivation; however, without knowledge of their students' musical aptitudes, teachers have limited understanding of how to best provide musical instruction.

Understanding students' music aptitudes helps teachers differentiate instruction. Teachers who know students' music aptitudes have a better idea of what tasks to assign to students, how to implement supports, and how to best tailor instruction to students who excel or students who are struggling. Having a better understanding of students' musical potential helps teachers provide appropriate rigor for each student (2012).

Through the lens of academic achievement, Klinedinst (1991) reported that reading achievement, scholastic ability, math achievement, and self-concept in reading were significant factors of instrumental music continuance, while music aptitude was not a significant predictor of continuance. Allen (1981) also found that students who quit instrumental music classes reported that their willingness to continue—or lack thereof—was most affected by difficulty reading music. Additionally, teachers felt that difficulty with music reading was a large contributor to student attrition from instrumental music classes.

In a review of literature, Kuhlman (2005) stated that teachers who put an emphasis on music reading often lose students of limited academic ability, regardless of music aptitudes (Allen, 1981; Bailey, 1975; Brown, 1966; Klinedinst, 1991; Mawbey, 1973; Pruitt, 1966). Said another way, students who are not academically proficient, particularly in the area of reading, would experience barriers to music learning and lower levels of expectancy (i.e., feelings of competence) in instrumental music classes.

Kinney (2019) found that students who are typically higher academic achievers were more likely to initially enroll in instrumental music classes and more likely to persist in instrumental music classes. Math achievement, in particular, was significant in predicting both initial enrollment and continuance in band and orchestra classes. Kinney, too, found that reading achievement was significant in predicting continuance in band; however, it did not significantly predict initial enrollment rates.

In their 2015 work, Barron and Hulleman proposed a model that that took expectancy (“Can I do it?”) and value (“Do I want to do it?”) into account, while adding the component of cost, or barriers related to task completion. They stated that while it is

important that students experience positive levels of expectancy and value, students also need to be free of costs to demonstrate motivated behaviors. Students who respond positively to questions of expectancy and value, but remain unmotivated, are likely inhibited by cost, which includes effort related and unrelated to the task, loss of valued alternatives, and negative psychological experiences.

That said, without a standard measure of motivation, it is impossible to know how an understanding of audiation and music aptitude affects student motivation. Thinking through the lens of attribution theory, a model of motivation that focuses its attention on how people make sense of what they experience (Cogdill, 2015), students may attribute successes or failures to ability or intelligence, implying some sort of fixed mindset (Dweck, 2008). Through the lens of self-determination theory, Ryan and Deci (2000) state that three psychological needs have to be present for students to be motivated to continue learning: competence, autonomy, and relatedness. This may suggest that students with higher potentials to achieve might experience higher levels of competence. However, does this also imply that students with lower levels of music aptitude would be less competent and therefore less likely to be motivated to learn?

Student attrition should be of concern to all instrumental music teachers. Since student attrition rates in beginning instrumental music classes can be nearly 50% at the end of the first year of study (Gamin, 2005), teachers ought to know what factors contribute to students leaving their classes. This study will, hopefully, inform further research determining what factors contribute to and predict student attrition in instrumental music classes. The purpose of this study was to determine relationships

among expectancy, value, cost, music aptitude, academic achievement, race, gender, instrument type, and continuance rates of first-year instrumental music students.

Definitions and Key Terms

For the purposes of this study, I am using the following terms and definitions:

Academic Achievement: A student's performance in math and reading. Academic achievement was assessed in terms of Rasch Unit (Rasch, 1993) scores on portions of the standardized test *Measures of Academic Progress* (Northwest Evaluation Association, 2011).

Music Aptitude: A student's potential to achieve in music. Music aptitude can be measured using a variety of instruments (e.g., *Audie*, *Primary Measures of Music Audiation*, *Intermediate Measures of Music Audiation*, *Musical Aptitude Profile*, *Advanced Measures of Music Audiation*) designed for different age groups (Gordon, 2001).

Audiation: The sensation of hearing sound that is not physically present. Audiation is considered to be musical thought (Gordon, 2012).

Gender: Male or female according to the school district where the study took place. Refers to attitudes, feelings and behaviors that a given culture associates with a person's biological sex. Behavior that is compatible with cultural expectations is referred to as gender-normative; behaviors that are viewed as incompatible with these expectations constitute gender nonconformity (American Psychological Association, 2015).

Motivation: Factors that influence students' academic achievement or academic choices. Motivation is separated into three distinct categories (Kosovich et al., 2015):

Expectancy: Reflection of the extent to which a student thinks he or she can be successful in a task.

Value: Reflection of the extent to which a student thinks a task is worthwhile (Wigfield & Cambria, 2010).

Cost: Reflection of negative aspects of engaging in an activity, such as perceptions of the effort and time required to be successful, the loss of engaging in other valued activities, or negative psychological states such as struggling or failing at the activity.

Race: The school district where this study took place defines race as White, Black/African American, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and Two or More (United States Census Bureau, n.d.).

Chapter Two: Literature Review

From literature, I have identified several variables that appear be important predictors of student continuance in instrumental music classes. These variables are: motivation, music aptitude, academic achievement, race, gender, and instrument type.

Motivation

How do teachers measure student motivation? How do they account for the multitude of factors that compete for students' attention, or the way a student's gender or race influences how students value a subject? Are there social indicators to describe how hard a student tries, or whether they expect to achieve at a high academic level? How does having a newborn baby brother or sister at home affect how much a student is willing to persist in a challenging academic environment? Questions related to student motivation are endless. This, of course, complicates ways in which researchers, teachers, and administrators measure student motivation.

Measuring motivation only becomes more complex when one stops to consider what motivational model they might use. Eccles et al. (1983) developed the expectancy-value model to gain understanding of student levels of performance, continuance, and achievement in education. This model captures important parts of what motivates students, simplifies and combines various theoretical viewpoints, and describes wide ranges of achievement-related behaviors (Barron & Hulleman, 2015).

The two components of this model indicate that motivation in school is dependent on student levels of expectancy and value of academic material. Expectancy is a kind of "can do" motivation; that is, it represents a student's belief that he or she *can* learn the

material. The other component, value, implies a kind of ‘want to’ motivation, where value represents how much worth students attach to course material.

Expectancy-value models of motivation contain three key properties: developmental, psychological, and integrative (Barron & Hulleman, 2015). From a developmental perspective, expectancy and value emerge over time from a variety of contextual and individual factors (Eccles et al., 1983). Psychologically speaking, expectancy and value stem from an individual's subjective beliefs. Eccles’s (2015) model included the integrative realm in an effort to bring together various theoretical perspectives, helping to better explain and understand student levels of achievement, continuance, and student choice.

In the expectancy-value-cost model (Barron & Hulleman, 2015), the additional component of cost helps to determine motivations for behavior through four subcategories: effort associated with the task, effort not associated with the task, loss of valued alternatives, and negative psychological experiences. Effort and resources required, however, are only categorized as cost when a student perceives those to be too much.

Within music education, McPherson and Hendricks (2010) found that American students had lower competence (i.e., expectancy) and value (i.e., want to) beliefs for music than any other school subject. Interestingly, even though expectancy values were lower, students considered music to be the easiest subject. Hurley (1992) investigated causes of students beginning and continuing/discontinuing orchestral string instruction. Generally, students maintained a positive attitude about their orchestral strings class; however, compared to other electives, they believed instrumental music classes took time

away for them to participate in these more valued courses. Hurley (1992) also considered expectancy when exploring continuance rates in strings through the lens of the expectancy-value model. Students' perceived levels of ability, or expectancy, have an important relationship with motivation. This is supported by Eccles et al.'s (1983) work, further emphasizing that expectancy and value stem from an individual's subjective beliefs.

Hawkinson (2015) researched factors and barriers contributing to high school students' continuation in school music classes, with an emphasis on perceptions of students from minority groups and with free and reduced lunch status. Four predictors were statistically significant predictors of high school music class participation: (a) perceptions and attitudes towards school music, (b) personal perception constraints, (c) conflicting activity constraints, and (d) school music structural constraints. Qualitatively, students frequently cited that they did not have enough talent to participate in curricular music classes.

Music Aptitude

Gordon (2012) described music aptitude as audiation potential; that is, individuals' potential ability to ascribe meaning to sound (as through thought in language). Audiation is not simply imagining music that has been previously heard or performed, but rather comprehending past music.

Music aptitude, along with music achievement, audiation, and assessment of music learning, can be used to guide music instruction to better meet the needs of each student. Music aptitude, however, can also influence student motivation and affect pedagogy. Gordon (2012) stated that an appropriate method based on audiation is

fundamental to student motivation, and that excitement for music will quickly diminish when students are not motivated by success in learning. Based on Gordon's assertion, if music achievement is heavily influenced by a student's music aptitude, and motivation to continue might be dependent on student success, then music aptitude should be an indicator of whether a student is motivated to continue study in an instrumental music class.

In order to measure music aptitude, Gordon developed the *Musical Aptitude Profile* (MAP; 1965, 1995). The purpose of MAP is to objectively evaluate students' music aptitude so that the teacher can better provide for individuals' needs and abilities. The test measures basic musical factors (i.e., tonal imagery, rhythm imagery, musical sensitivity) using a battery of seven subtests. MAP measures tonal and rhythmic aptitude, as well as musical sensitivity (i.e., phrasing, balance, style).

Academic Achievement

According to Sala and Gobet's multilevel meta-analysis of 54 full-text articles (2020), academic achievement has little to do with music achievement. Articles described experimental studies with an adequate control group, a non-music/cognitive academic test, participants with no previous formal music training, and sufficient power to calculate a significant effect size. While Jaušovec & Pahor (2017) suggested that playing the piano or violin boosts cognitive ability, Sala and Gobet conversely state that the belief that music benefits academic achievement, specifically in math and reading, is empirically unjustified, resulting from misinterpreted data and possible confirmation bias. They also conclude that music training fails to boost cognitive ability and academic achievement.

Guhn, Emerson, and Gouzouasis (2020), however, found that in four British Columbia high schools, school music achievement, music engagement, and music participation were all related to higher exam scores. Additionally, they found that there was an even higher relationship between high exam scores and music achievement, music engagement, and music participation in instrumental music classes.

In another study, Gouzouasis et al. (2007) examined the relationship between achievement and participation in music and achievement in academic courses in 17- and 18-year-old students in British Columbia. They concluded that grade 11 music achievement predicted grade 12 academic achievement. Across several cohorts, music participation was associated with generally high academic achievement. Interestingly, the relationship between music achievement and achievement in math and science classes was stronger than the relationship between music achievement and achievement in English classes. Gouzouasis, et al. also suggested that music participation fosters achievement in academic core subjects, such as math, English, and biology.

Elpus and Abril (2019) constructed a complete demographic profile of music ensemble students of the class of 2013 using nationally representative data. Students who enrolled in at least a single year in an instrumental music class (e.g., band or orchestra) are, on average, achieving higher grades prior to high school than their peers who choose never to take orchestra or band. This suggests that academic achievement may be a predictor of continued enrollment in instrumental music ensembles.

Race

Race in music education, as it relates to continuance, is an area of research in which I have found some gaps in the literature. Students of color—particularly those of

low socioeconomic status—are more likely to drop out of instrumental music classes. Elpus and Abril (2011, 2019) found that in high school band and orchestra classrooms, White students were overrepresented, while African American and Latinx students were significantly underrepresented.

The trend of White overrepresentation in band and orchestra is likely taking place in middle school instrumental music classrooms as well (Hoylman, 2019). As a result, students of color are underrepresented in repertoire and in classical music more generally. Elpus (2015) reported that 86.02% of music teacher licensure candidates identified as White, based on Praxis II data provided by the Educational Testing Service between 2007 and 2012. This implies that communities of color are vastly underrepresented in the field of practicing music educators, at least in states where a Praxis II test in music is required to obtain a teaching license.

Gender and Instrument Type

Researchers have conducted studies to better understand the gender roles children place on instrument types. Findings indicate that boys tend to gravitate to instruments like guitar or drums, while girls tend to prefer instruments like violin or piano (O'Neill & Boultona, 1996). Sinsel et al. (1997) confirmed these findings and suggested that to improve continuance in instrumental music education, children's psychosocial identities should be taken into account. Due to culturally-ingrained ideas about which instruments represent which gender, students may be limited in the selection of which instrument they would like to play, and in which music ensembles they may take part (Eros, 2008).

While there are instrument-gender associations for both masculine and feminine sex-typed children, Harrison and O'Neill (2000) found that these associations of

instruments with specific genders can be easily influenced by decoupling instruments and their stereotypical gender associations. In fact, immediately following concerts where students observed women playing guitar and men playing piano, student perception of own-sex appropriate instruments changed.

Wrape et al. (2016) found that beginning bands contain the fewest stereotypical gender associations between students and their chosen instruments. As experience levels increased, so too did stereotypical gender associations between students and instruments. This could suggest that students who choose an instrument stereotypically aligned with their gender may have a greater chance of persisting in band. There is, however, some disagreement among teachers and students regarding gender and associated instruments due to new research and awareness of stereotypes' presence and effects (Eros, 2008).

Based on previous research, we know that factors that may affect student continuance in instrumental music are numerous and complex. Music aptitude, academic achievement, race, gender, and instrument type are all variables that likely interact with motivation. These variables all appear to contribute to motivating students to continue or not—individually, or in some sort of combination. Examining these factors through lenses of expectancy, value, and cost should shed new light on what motivates students to continue or not.

Purpose and Research Questions

The purpose of this study was to determine relationships among expectancy, value, cost, music aptitude, academic achievement, race, gender, instrument type, and continuance rates of first-year instrumental music students. Data were collected through

Gordon's *Music Aptitude Profile* (1965), school records, and the EVC Survey (Kosovich et al., 2015). The following research questions guided my inquiry:

1. How does attrition among beginning instrumental students vary by race, gender, and instrument type?

2. What relationships do music aptitude and academic achievement have with student attrition in beginning instrumental music?

3. How do students' expectancy, value, and cost for beginning instrumental music predict attrition?

4. How can race, gender, instrument type, expectancy, value, cost, music aptitude, and academic achievement most parsimoniously predict beginning instrumental student attrition?

Chapter Three: Method

The purpose of this study was to determine relationships among expectancy, value, cost, music aptitude, academic achievement, race, gender, instrument type, and continuance rates of first-year instrumental music students. The following research questions guided my inquiry:

1. How does attrition among beginning instrumental students vary by race, gender, and instrument type?

2. What relationships do music aptitude and academic achievement have with student attrition in beginning instrumental music?

3. How do students' expectancy, value, and cost for beginning instrumental music predict attrition?

4. How can race, gender, instrument type, expectancy, value, cost, music aptitude, and academic achievement most parsimoniously predict beginning instrumental student attrition?

Research Setting and Participants

I conducted this study at Tiger Woods Middle School (pseudonym), part of a large suburban district in the mid-Atlantic United States. As of 2020, the school district educates approximately 84,000 students (Virginia Department of Education, n.d.) and has 17 high schools, 17 middle schools, and 51 elementary schools. District schools offer courses including general music, music lab, guitar, band, choir, and orchestra, as well as extracurricular opportunities including jazz band, marching band, school musicals, and show choir. The county employs 213 music teachers, one full time music administrator, and one full time fine arts administrator.

The population of this study was sixth-grade beginning band students (N = 134) at Tiger Woods Middle School. The sample (n = 30) used in my research comprised first-year band students who provided assent and whose parents provided consent to participate in my research. James Madison University and the associated school district provided institutional review board approval for all study procedures.

Research Design

I chose to explore attrition through quantitative analysis because it would provide a broad idea of what factors influenced first-year instrumental music student attrition rates. The motivation for me to complete this project originated from classroom observations made throughout my career, with hopes that I could build a predictive model and design a study that could be replicated in schools in the county where Tiger Woods

Middle School is located or, ideally, on a scale larger than the county where the study took place. Additionally, due to the Covid-19 pandemic, I felt that it would be a better use of time to collect quantitative data via survey and school databases of existing information, rather than finding ways to conduct interviews while managing social distancing protocols. I chose regression analysis, specifically binary logistic regression, to analyze my collected data. Logistic regression is a model for predicting categorical outcomes from categorical and continuous predictor variables (Field, 2017). Because some data did not meet assumptions for binary logistic regression, I used Chi-Square tests. In this study, I examined relationships between a number of predictor variables and the binary outcome variable of student continuance in band. A report of my findings will be presented in Chapter Four: Results, followed by conclusions and discussion in Chapter Five: Discussion.

Institutional Review Boards

James Madison University (JMU) and the associated school district provided institutional review board approval. JMU granted approval following a full board review. I chose participants based on their enrollment in band classes at Tiger Woods Middle School. I obtained parent consent and student assent from all participants whose data is included in this study. Students who assented, and whose parents provided consent, completed the EVC Survey (Kosovich et al., 2015). I obtained other data via school databases and teacher records. I compiled collected data and coded them to protect participants' anonymity. After coding, I entered the data into IBM SPSS Statistics and analyzed it. I stored all data in a secure Google Drive, managed for privacy by the associated school district.

Data Sources, Collection, and Analysis

Data Sources and Collection

Race. Students race was obtained from records of the school district where the study took place. The school district provides parents/guardians five options by which to identify students: Black or African American, American Indian or Alaskan Native, Asian, White, and Native Hawaiian or Other Pacific Islander. Parents/guardians may categorize students who they identify as more than one race as Two or More. Race/ethnicity codes were recorded in accordance with the guidelines of the U.S. Office of Management and Budget (1997).

Gender. I collected gender data from school records. Parents/guardians define students' gender identities using two binary options: male or female. Non-binary genders are not reflected in school data. Gender codes were recorded in accordance with the guidelines of the U.S. Office of Management and Budget (1997).

Music Aptitude. Gordon designed the *Music Aptitude Profile* (MAP; 1965, 1995) to measure music aptitude. MAP consists of three dimensions: tonal imagery (i.e., melody, harmony), rhythm imagery (i.e., tempo, meter), and musical sensitivity (i.e., phrasing, balance, style). MAP can be completed in three and one half hours. Researchers have documented that MAP is a reliable and valid way to measure music aptitude (Gordon, 1967; Kuhlman, 2005; Schleuter, 1978).

Students completed the *Music Aptitude Profile* (*MAP*; Gordon, 1995) in two separate sessions using a hybrid learning model. Some students completed MAP in person, while others completed it at home (see Appendices I, J, and K). Only the T-1 and R-2, assessing melody and meter, subtests were administered due to time constraints.

Raw scores were converted to standard scores, per Gordon's (1989) suggestion. Standard scores were then added to create a composite score, emulating the *Advanced Measures of Music Audiation* (Gordon, 1989).

Academic Achievement. The *Measures of Academic Progress Growth Test* (MAPGT) is designed to measure students' readiness to learn an academic concept or skill. This test is used to assess students' academic growth over time. Teachers and administrators administer MAPGT reading and math growth to students from grades two through eight. In the district that includes Tiger Woods Middle School, core academic teachers and administrators administered MAPGT tests at three different points throughout the academic year: fall, winter, and spring.

Teachers use MAPGT results to set student growth goals, to differentiate instruction and to monitor student progress toward growth goals throughout the year. School administrators also use MAPGT test scores to identify professional development needs and assess students' achievement in various grade levels and subject areas. I collected academic achievement data from Tiger Woods Middle School records.

Motivation. Kosovich et al. (2015) developed the EVC Survey to measure three motivational components: expectancy, value, and cost. The survey consists of ten Likert-style questions on a one to six scale with responses ranging from Strongly Agree to Strongly Disagree, providing six possible response options, and two open-ended items, which, for the purposes of this study, I did not analyze.

Results are separated into three categories: expectancy mean, value mean, and cost mean. Expectancy and value means are each calculated by averaging three questions, while cost mean is calculated by averaging four separated questions.

Students completed the EVC Survey (Kosovich et al., 2015), which measures student rates of expectancy, value, and cost, in three separate categories. I administered the survey via Google Form (see Appendix G and H) in students' resource or Spectrum (i.e., gifted) classes. Responses were given numeric values and averaged based on which category they belonged to.

Instrument Type. Instrument type was collected from teacher records based on the instruments students choose to play for the year. Students' instrument types were categorized as woodwinds, brass, or percussion.

Continuance in Instrumental Music Class. Tiger Woods Middle School's counseling department provided data on student continuance in instrumental music class using class rosters for the next academic year. I categorized students who were not present on the list as not continuing.

Data Analysis

Data were entered into a Microsoft Excel spreadsheet and saved to an encrypted Google Drive account. There were two instances of missing data from MAP, one occurring within the melody portion and one occurring in the meter portion. I consulted Gelman and Hall (2007) and, in consultation with my advisor, determined that data were missing completely at random. Due to the small sample size, I did not want to eliminate any cases. Gelman and Hall (2007) provided six options for substitution of data, and I chose mean imputation because it provided the most feasible solution to substitute for missing data. I identified missing data and substituted means for missing values. Data were analyzed using IBM SPSS Statistics to analyze descriptive statistics, logistic regressions, and Chi-Squares, and saved to an encrypted Google Drive account.

Chapter Four: Results

The purpose of this study was to determine relationships among expectancy, value, cost, music aptitude, academic achievement, race, gender, and instrument type, and continuance rates of first-year instrumental music students at Tiger Woods Middle School. I initially planned to answer my research questions using binary logistic regression but, after testing model assumptions, I determined that race, gender, and instrument type could not be included in the model, but that logistic regression could be used for the rest of the variables. I did not find linearity between these variables and the mean outcome, and I also discovered that observations did not meet the assumptions of the model. I found complete separation among the categorical variables, so I used a Chi-Square test to examine relationships between categorical variables (i.e., race, gender, instrument type) and the binary outcome variable (i.e., student continuance) and logistic regression analyses to determine the relationship between multiple continuous predictor variables (i.e., expectancy, value, cost, academic achievement, music aptitude) and the binary outcome variable (i.e., student continuance) and multiple predictor variables. Means and standard deviations for each continuous variable appear in Table 4.1.

Table 4.1

Means and Standard Deviations of Continuous Variables

		Academic Achievement	Expectancy	Value	Cost	Music Aptitude
N	Valid	30	30	30	30	30
	Missing	0	0	0	0	0
Mean		473.17	4.287	4.263	3.6967	102.40
Std. Deviation		30.463	.3288	.3200	.39977	18.038
Range		132	1.3	1.0	1.50	70

Note. Standard deviation for music aptitude may be underestimated due to mean imputation (Gelman & Hall, 2007).

I also ran a correlational analysis to determine which predictor variables were most correlated with the outcome variable of continuing. These coefficients are displayed in Table 4.2.

Table 4.2

Correlational Analysis of Predictor and Outcome Variables

Correlations

		expectancy mean	value mean	cost mean	MAPSSComposite	MAP2Composite	gender	Race	Instrument type	Continuing
expectancy mean	Pearson Correlation	1	-.015	.161	.120	.430*	-.181	-.004	-.116	.392*
	Sig. (2-tailed)		.939	.395	.527	.018	.338	.985	.541	.032
	N	30	30	30	30	30	30	30	30	30
value mean	Pearson Correlation	-.015	1	-.266	-.072	.195	.307	.102	.145	-.139
	Sig. (2-tailed)	.939		.155	.705	.302	.099	.593	.444	.462
	N	30	30	30	30	30	30	30	30	30
cost mean	Pearson Correlation	.161	-.266	1	-.064	-.191	-.015	.066	.148	-.185
	Sig. (2-tailed)	.395	.155		.736	.311	.936	.727	.434	.327
	N	30	30	30	30	30	30	30	30	30
MAPSSComposite	Pearson Correlation	.120	-.072	-.064	1	.413*	-.342	.164	-.257	.426*
	Sig. (2-tailed)	.527	.705	.736		.023	.065	.386	.170	.019
	N	30	30	30	30	30	30	30	30	30
MAP2Composite	Pearson Correlation	.430*	.195	-.191	.413*	1	.076	-.156	-.293	.435*
	Sig. (2-tailed)	.018	.302	.311	.023		.690	.410	.117	.016
	N	30	30	30	30	30	30	30	30	30
gender	Pearson Correlation	-.181	.307	-.015	-.342	.076	1	-.006	.273	-.420*
	Sig. (2-tailed)	.338	.099	.936	.065	.690		.975	.144	.021
	N	30	30	30	30	30	30	30	30	30
Race	Pearson Correlation	-.004	.102	.066	.164	-.156	-.006	1	.110	.021
	Sig. (2-tailed)	.985	.593	.727	.386	.410	.975		.564	.913
	N	30	30	30	30	30	30	30	30	30
Instrument type	Pearson Correlation	-.116	.145	.148	-.257	-.293	.273	.110	1	-.081
	Sig. (2-tailed)	.541	.444	.434	.170	.117	.144	.564		.670
	N	30	30	30	30	30	30	30	30	30
Continuing	Pearson Correlation	.392*	-.139	-.185	.426*	.435*	-.420*	.021	-.081	1
	Sig. (2-tailed)	.032	.462	.327	.019	.016	.021	.913	.670	
	N	30	30	30	30	30	30	30	30	30

*. Correlation is significant at the 0.05 level (2-tailed).

Note. Standard deviations for music aptitude may be distorted and pulled toward zero as a result of mean imputation (Gelman & Hall, 2007).

Research Question 1: Race, Gender, Instrument Type (Chi-Square Tests)

Race and Continuance. I performed a Chi-Square test of independence to examine the relationship between race and continuance in instrumental music class (see Table 4.3). The relationship between these variables was small (R = .021) and not statistically significant, X^2 (4, N = 30) =5.286, p = .086.

Table 4.3

Race and Continuance

Crosstab

Count

		Continuing		
		No	Yes	Total
Race	Black/African American	2	1	3
	Asian	1	10	11
	Hispanic	1	2	3
	White	2	10	12
	Two or more	1	0	1
Total		7	23	30

Gender and Continuance. I performed a Chi-Square test of independence examine the relationship between gender and continuance in instrumental music class (see Table 4.4). The correlation between these variables was strong (R = .420) and significant, X^2 (1, N = 30) =5.286, p = .021.

Table 4.4

Gender and Continuance

Crosstab

Count

		Continuing		
		No	Yes	Total
gender	Female	0	11	11
	Male	7	12	19
Total		7	23	30

Instrument Type and Continuance. I performed a Chi-Square test of independence to examine the relationship between instrument type and continuance in instrumental music class (see Table 4.5). The relation between these variables was not significant, X^2 (2, N = 30) = 3.266, p = .195. Similarly, the magnitude of the correlation was small (R = -.081) between instrument type and continuance in an instrumental music class.

Table 4.5

Instrument Type and Continuance

Crosstab

Count

		Continuing		
		No	Yes	Total
Instrument type	Woodwinds	1	9	10
	Brass	6	11	17
	Percussion	0	3	3
Total		7	23	30

Research Question 2: Music Aptitude and Academic Achievement (Logistic Regression)

I conducted a binary logistic regression analysis to investigate student continuance in band classes at Tiger Woods Middle School based on two predictor variables: music aptitude and academic achievement. These predictor variables were tested a priori to verify there was no violation of the assumption of the linearity of logit. In the logistic regression analysis, neither predictor variable contributed significantly to the model. Unstandardized Beta weights for the constant, music aptitude, and academic achievement are in Table 4.6.

Table 4.6

Logistic Regression: Music Aptitude and Academic Achievement Variables

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Academic Achievement	.040	.023	2.873	1	.090	1.040
	Music Aptitude	.052	.034	2.283	1	.131	1.053
	Constant	-22.115	10.935	4.091	1	.043	.000

a. Variable(s) entered on step 1: Academic Achievement, Music Aptitude.

The binary logistic regression model was statistically significant, $\chi^2(2) = 18.370$, $p = .009$, and explained 41% (Nagelkerke R^2) of the variance in student continuance in instrumental music classes, correctly classifying 90.0% of cases (see Table 4.7).

Table 4.7

Music Aptitude, Academic Achievement, and Continuance

Classification Table[a]

			Predicted		
			Continuing		Percentage
	Observed		No	Yes	Correct
Step 1	Continuing	No	4	3	57.1
		Yes	0	23	100.0
	Overall Percentage				90.0

a. The cut value is .500

Research Question 3: Expectancy, Value, and Cost Means (Binary Logistic Regression)

I conducted a binary logistic regression analysis to determine the relationship between three motivation predictor variables (i.e., expectancy, value, cost) and continuance in instrumental music. These predictor variables were tested a priori to verify there was no violation of the assumption of the linearity of logit. In a logistic regression analysis, expectancy contributed significantly to the model ($p \leq 0.05$), while value and cost did not contribute significantly. Unstandardized Beta weights for the constant, expectancy, value, and cost are in Table 4.8.

Table 4.8

Expectancy, Value, and Cost Variables

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Expectancy	4.520	2.208	4.192	1	.041	91.821
	Value	-2.552	2.306	1.225	1	.268	.078
	Cost	-2.503	1.697	2.176	1	.140	.082
	Constant	2.394	12.958	.034	1	.853	10.960

a. Variable(s) entered on step 1: Expectancy, Value, Cost.

The binary logistic regression model was statistically significant, $\chi^2(4) = 26.433$, $p = .032$, and explained 38.4% (Nagelkerke R^2) of the variance in student continuance in instrumental music classes, correctly classifying 86.7% of cases (see Table 4.9).

Table 4.9

Expectancy, Value, Cost, and Continuance

Classification Table[a]

			Predicted		
			Continuing		Percentage
	Observed		No	Yes	Correct
Step 1	Continuing	No	3	4	42.9
		Yes	0	23	100.0
	Overall Percentage				86.7

a. The cut value is .500

Research Question 4 (Binary Logistic Regression)

I conducted a binary logistic regression analysis to investigate student continuance in band classes at Tiger Woods Middle School. To build the model, I constructed a hierarchical model in the order based on variables in existing literature that I felt would be most significant (Field, 2017). Variables were retained based on how

much they improved the model. Academic achievement was excluded as a predictor variable because it did not significantly improve the model; gender, race, and instrument type were excluded because they were completely separated on the outcome variable. Four predictor variables—expectancy mean, value mean, cost mean, and MAP standard score composite—contributed to the logistic regression model. These predictor variables were tested a priori to verify there was no violation of the assumption of the linearity of logit. The unstandardized Beta weights for the constant, expectancy, cost, value, and music aptitude are displayed in table 4.10.

Table 4.10

Expectancy, Cost, Value, and Music Aptitude Variables

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Expectancy	3.903	2.236	3.048	1	.081	49.535
	Cost	-2.167	1.943	1.244	1	.265	.115
	Value	-1.644	2.415	.463	1	.496	.193
	Music Aptitude	.057	.035	2.628	1	.105	1.059
	Constant	-5.813	16.110	.130	1	.718	.003

a. Variable(s) entered on step 1: Expectancy, Cost, Value, Music Aptitude.

The binary logistic regression model was statistically significant, $\chi^2(4) = 47.692$, $p = .018$, and explained 50% (Nagelkerke R^2) of the variance in student continuance in instrumental music classes, correctly classifying 93.3% of cases (see Table 4.11).

Table 4.11

Expectancy, Cost, Value, Music Aptitude, and Continuance

Classification Table[a]

			Predicted		
			Continuing		Percentage
	Observed		No	Yes	Correct
Step 1	Continuing	No	5	2	71.4
		Yes	0	23	100.0
	Overall Percentage				93.3

a. The cut value is .500

Chapter Five: Discussion

In this study, I examined relationships between a number of predictor variables and the binary outcome variable of student continuance in band. In addition, I made an effort to examine how attrition among beginning instrumental students varied by race, gender, and instrument type, determine relationships between music aptitude, academic achievement, and student attrition rates, and how students' expectancy, value, and cost means helped predict instrumental music attrition.

Threats to Validity/Limitations

A limitation of this study is that I did not take socioeconomic status (SES) into account due to that information being restricted to the principal and student liaison of Tiger Woods Middle School. In this particular district, SES is determined by access to free and reduced lunch.

An additional limitation was that there were two occurrences of missing music aptitude data. Gelman and Hall (2007) caution that the mean imputation strategy I used is prone "to complications with summary measures including, notably, underestimates of the standard deviation. Moreover, mean imputation distorts relationships between variables by 'pulling' estimates of the correlation toward zero" (pp. 532—533). I, therefore, was mindful of these potential complications when interpreting the data.

While data obtained in this research is limited to Tiger Woods Middle School, this model could be examined further with a larger sample size and a more diverse data set. Additionally, race, gender, and instrument type could not be included in the logistic regression model because they did not meet the assumptions of the model (Schreiber-Gregory, 2018). Female gender was completely matched with continuance because there

were no female students who chose not to continue. Similarly, students of two or more races were matched with non-continuance, and percussionists were matched with continuance.

Conclusions

Overall, I concluded that a binary logistic regression model including expectancy levels, value levels, cost levels, and music aptitude accurately predicted student attrition rates in instrumental music classes at Tiger Woods Middle School. Race and instrument type were not strongly correlated with continuation in an instrumental music class, while gender had a moderately strong correlation with that outcome variable, likely due to the fact that all females chose to continue. It is, however, important to note that each of these predictor variables violated the assumption that there was a linear relationship between them and the log odds of continuing in instrumental music. In this study, gender, race, and instrument type could not predict student attrition in instrumental music classes due to complete separation of these predictor variables on the outcome variable. This does mean, however, that they might be applicable in future research.

Music aptitude and academic achievement were significantly correlated with student continuation in instrumental music class (see Table 4.2), meaning that high MAP and MAPGT scores were positively correlated with continuation. Similarly, low MAP and MAPGT scores were positively correlated with discontinuing participation in instrumental music class. This supports Gordon's (2012) theory that music aptitude is a significant component of motivation to learn music in that it has potential to bolster student levels of expectancy; however, it does not account for students' values of

instrumental music classes. Additionally, low MAP scores may contribute to student levels of cost, as they potentially lower student levels of expectancy.

This finding also supports Kinney's (2019) conclusion that achievement in math and reading positively contribute to student continuance in instrumental music. Music aptitude and academic achievement may lead to higher levels of expectancy. If students have a higher potential to succeed in music, they likely foster perceptions that they will succeed in music. If students have historically experienced academic success, then they too probably foster perceptions that they will succeed in music, as long as they view it like any other academic course in which they have been enrolled.

Motivation scores were broken into three categories: expectancy, value, and cost (Barron et al., 2017). Typically, students' expectancy levels positively predict academic achievement outcomes, students' value levels positively predict interest outcomes, and students' cost levels negatively predict both achievement and interest outcomes, while helping to predict achievement and interest outcomes (Kosovich et al., 2015). In the present study, however, when I examined these three categories of motivation, expectancy values were found to be the only significant predictor of the outcome of student continuance in instrumental music classes ($p = .041$). This is contrary to researchers' assumptions that value most positively predicts academic choice (continuance). This could be attributed to elective enrollment in instrumental music classes, implying that students enroll in them based on their value of the material.

I considered a variety of binary logistic regression models when exploring which predictor variables most parsimoniously predicted the outcome variable. The strongest model contained predictor variables of expectancy mean, value mean, cost mean, and

music aptitude. While only expectancy mean, music aptitude, and academic achievement were significantly correlated with the outcome variable (see Table 4.2), the model containing those four predictor variables (i.e., expectancy mean, value mean, cost mean, and music aptitude) was the most statistically significant (p = .018), and predicted outcomes most accurately (93.3%). Although value and cost levels did not significantly correlate with the outcome, they did improve the logistic regression model. Thus, they may play a larger role in predicting student continuance than was originally expected.

Classroom Implications

While this model effectively predicted what factors most predict student continuance, it is important to note that due to small sample size and study limitations, these findings may not be generalizable beyond Tiger Woods Middle School. It is, however, interesting to note that expectancy was the most significant predictor (see Table 4.10) of whether or not students would continue, in contrast to previous findings that value is the most significant predictor of academic choice (Kosovich et al., 2015).

When considering motivation, instrumental music teachers might consider several ways to increase students' expectancy. Digital learning platforms (e.g., Google Classroom, Schoology, Blackboard, Canvas) provide substantial ways in which teachers can increase student support. Recorded lessons, play along tracks, digital fingering charts, professional recordings, and student access to direct lines of communication with the teacher may all facilitate students feeling supported in instrumental music classrooms. Teachers should also consider ways in which they provide feedback. Limiting feedback to addressing only a task or activity at hand reduces risks that students feels that feedback reflects their overall ability, which may decrease expectancy.

Giving students access to supports, providing specific task-related feedback, assigning appropriately difficult tasks, facilitating student goal setting, clearly outlining expectations for a given task, and incorporating activities where students are highly likely to experience success are all ways that teachers can boost student expectancy (Barron, Getty, & Hulleman, 2015).

Similarly, teachers should make an effort to reduce students' costs in order to facilitate higher student achievement and interest. While cost was not significantly correlated to continuation in instrumental music, it did improve the binary logistic regression model when combined with value, expectancy, and music aptitude, so it is still an important factor to consider. Instrumental music teachers can reduce cost by reducing task complexity and effort required to complete assignments. When given opportunities, teachers should limit long tasks that require significant effort to complete. They can also provide students with opportunities to find greater value within a task by allowing students to complete assignments within social settings (e.g., group work). Group work offers potential for students to experience individual success and observe their peers' success, increasing expectancy levels (Kosovich et al., 2015).

Teachers should consider limiting class time allotment and effort necessary to complete given tasks, increasing opportunities for students to find value in a given task, decreasing scenarios where negative psychological and emotional reactions might occur, and considering students' physical needs or limitations when planning activities within the classroom (Barron, Getty, & Hulleman, 2015).

A common practice in instrumental music classrooms is assessing students through playing tests. However, students who experience stage fright or performance

anxiety may experience negative psychological or emotional reactions to this activity. Providing multiple ways for students to show what they know, either digitally or through in-person demonstrations, may lower risks of students experiencing a negative psychological or emotional reaction in class. Additionally, teachers and schools should provide students with comfortable learning environments, where tasks do not become too physically strenuous.

Value, while also not significantly correlated with continuation, is still an important variable for practitioners to consider because it did improve the binary logistic regression model. Instrumental music teachers can boost students' perceptions of value by teaching music through content and experiences that are applicable to students' lives. This is not to say that all teachers should make an effort to include popular music in their classrooms as a way of making their classes more relevant; however, teachers should know what music their students are interested in, in order to make their classes germane. For some, popular music may be very pertinent; for others, Broadway, classical, world, or jazz may be most appropriate.

Instrumental music teachers should also search for ways to contextualize assignments in reality. Instead of planning musical activities that are designed to exist only within the vacuum of their instrumental music classroom, teachers should plan activities that mimic music activities outside of the classroom (e.g., recording projects, mixing and mastering music, performing as part of a chamber ensemble). Teachers can also increase levels of student value by modelling enthusiastically, making sure that class assignments and activities vary in regard to skills students are developing, and by facilitating student-to-student, and teacher-to-student interactions.

It is very important for teachers to be aware of a student's music aptitude is it relates to motivation. Music aptitude stabilizes around the age of nine (Gordon, 2012). While it is likely not possible for instrumental music teachers to improve students' developmental music aptitudes, levels of music aptitude should inform teachers' practices regarding planning and implementing instructional and assessment strategies. Teachers should provide appropriate levels of challenge necessary for students to achieve growth. When students engage in activities and assessments that are not appropriate based on their potential to learn music, their levels of value and expectancy will likely decrease.

Implications for Future Research

Taking into account study limitations, it would be worthwhile to replicate this study with a larger sample offering greater racial and gender diversity. A serious limitation of this study was that participation was limited in size and diversity, which reduced the possibility of the findings being generalizable to different populations. An increase in participation may yield different results due to the possibility that a larger sample size may make the variables of race, gender, and instrument type usable in the logistic regression model.

This study should be replicated within the school division where Tiger Woods Middle School is located to determine whether findings are similar with a larger, more diverse sample. It is interesting to consider how, in a school division in which sixth grade music study is compulsory, predictors might differ between initial enrollment and continuance rates in instrumental music classes. Additionally, it would be interesting to determine if students who were not continuing in band class were taking a different instrumental music class for which there is not a prerequisite (e.g., guitar), and if so, how

their levels of expectancy, value, cost, and music aptitude differ from those students who persist in the same music class.

Summary

Among students enrolled in band classes at Tiger Woods Middle School, a binary logistic regression model including expectancy, value, cost, and music aptitude significantly predicted whether or not students would continue in instrumental music. Expectancy was correlated most significantly with continuance, and the most significant predictor variable in the binary logistic regression model used to predict that outcome, which may suggest that it plays the largest role in predicting continuation among instrumental music students in this study. Music aptitude, or the potential to succeed in music, was the second most significant predictor in the binary logistic regression model. This makes sense since Kosovich et al (2015) determined that high ability or skill improves students' expectancy levels. While music aptitude is not a skill or ability, teachers could expect students with high music aptitudes to achieve at a high level in music. Therefore, students with higher music aptitudes may experience higher levels of expectancy. Although cost and value did not significantly correlate with continuance as individual variables, they were present in the logistic regression model that most parsimoniously predicted continuation and may warrant further study.

Due to the small sample size, limited sample diversity, and categorical variables not meeting logistic regression assumptions, more research is needed to confirm that race, gender, and instrument type did not play a significant role in predicting whether or not students would continue in their instrumental music classes.

Appendix A

JMU IRB Approval Letter

JAMES MADISON UNIVERSITY.

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE:	April 26, 2021
TO:	Andrew Duncan, MM, School of Music David Stringham, School of Music
FROM:	Lindsey Harvell-Bowman, Associate Professor, IRB Panel
PROTOCOL TITLE:	Attrition Rates in Instrumental Music: A Quantitative Study
FUNDING SOURCE:	None
PROTOCOL NUMBER:	21-2361
APPROVAL PERIOD:	**Approval Date:** April 26, 2021 **Expiration Date:** April 25, 2022

The Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled, "Attrition Rates in Instrumental Music: A Quantitative Study," under 45 CFR 46.110 Expedited Category 5, 7. The project has been approved for the procedures and subjects described in the protocol.

If your study requires any changes, the proposed modifications will need to be submitted in the form of an amendment request to the IRB. Any changes require approval before they can be implemented as part of your study. If there are any adverse events and/or any unanticipated problems during your study, you must notify the IRB within 24 hours of the event or problem.

This approval is issued under James Madison University's Federal Wide Assurance 00007339 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under the IRB's Assurance, please do not hesitate to contact ORI.

Please direct any questions about the IRB's actions on this project to the IRB Chair:

Dr. Lindsey Harvell-Bowman
harve2la@jmu.edu
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Lindsey Harvell-Bowman

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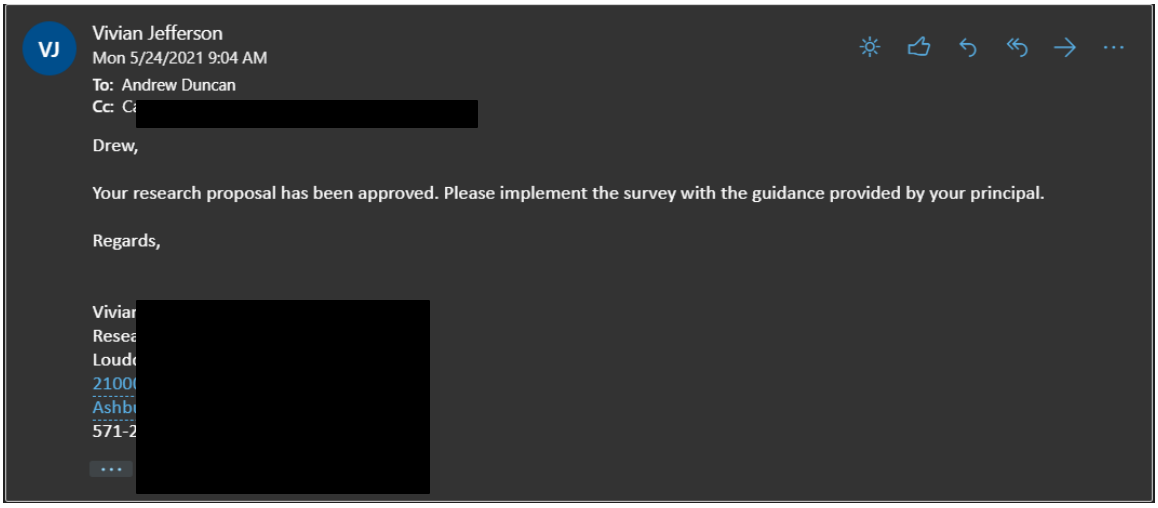
Appendix B

IRB Approval Email



Appendix C

Parent Consent Form

Attrition Rates in Instrumental Music: A Quantitative Study

Parent/Guardian Informed Consent

Identification of Investigators & Purpose of Study

Your child is being asked to participate in a research study conducted by Drew Duncan from James Madison University. The purpose of this study is to determine what factors contribute to beginning band students leaving band classes. This study will contribute to the researcher's completion of his master's thesis.

Research Procedures

If you decide to allow your child to participate in this research study, you will be asked to sign this consent form once all your questions have been answered completely. This study uses a survey that will be given to individual participants in J. Mi[redacted]ur child will be asked to provide answers to several questions related to motivating factors to learn in band class. I will also be using existing information, already obtained through LCPS[redacted] Measures of Academic Progress Growth Test, (b) Music Aptitude Profile, (c) race, (d) gender, (e) intended enrollment for the 2021-22 academic year. Students/parents who opt out of the survey will also take the survey during class time when it is being administered, however, their responses will be destroyed later.

Time Required

Participation in this study will require 10 to 15 minutes of your child's time.

Risks

The investigator does not perceive more than minimal risks from your child's involvement in this study (that is, no risks beyond the risks associated with everyday life).

Benefits

Potential benefits from participation in this study include improved classroom experiences in instrumental music classes, however, that are no direct benefits to children or parents.

Payment for participation

Participants and parents will not receive any payment for participating in this study

Confidentiality

The results of this research will be presented as part of my course requirements to earn my master's degree. Your child will be identified in the research records by a number. The researcher retains the right to use and publish data that does not include names or email addresses of students. When the results of this research are published or discussed in conferences, no information will be included that would reveal your child's identity. All data will be stored in a secure location accessible only to the researcher. After completing this study, all of the information that matches up individual students with their answers will be destroyed.

There is one exception to confidentiality we need to make you aware of. In certain research studies, it is our ethical responsibility to report situations of child abuse, child neglect, or any life-threatening situation to appropriate authorities. However, we are not seeking this type of information in our study and you will you not be asked questions about these issues.

Participation & Withdrawal

Your child's participation is completely voluntary. He/she is free to choose not to participate. If you and your child choose to participate, he/she can change their mind at any time without experiencing any negative consequences. Student grades will not be affected if you and your child choose not to participate.

Questions about the Study

If you have questions or concerns during the time of your child's participation in this study, or after it is completed, or you would like to receive a copy of the final results of the study, please contact:

Drew Duncan
Music Education
James Madison University
[redacted]

David Stringham
Music Education
James Madison University
Telephone: (540) 568-5279
Stringda@jmu.edu

Questions about Your Rights as a Research Subject

Dr. Lindsey Harvell-Bowman
Chair, Institutional Review Board
James Madison University
(540) 568-2611
harve2la@jmu.edu

Giving of Consent

I have read this consent form and I understand what is being requested of my child as a participant in this study. I freely consent for my child to participate. I have been given satisfactory answers to my questions. The investigator provided me with a copy of this form. I certify that I am at least 18 years of age.

_____
Name of Child (Printed)

_____
Name of Parent/Guardian (Printed)

_____ _____
Name of Parent/Guardian (Signed) Date

_____ _____
Name of Researcher (Signed) Date

Appendix D

Student Assent Form

CHILD ASSENT FORM (Ages 7-12)

IRB # **21-2361**

ASSESSMENT OF BEGINNER ATTRITION RATES IN BAND CLASSES.

I would like to invite you to take part in this study. We are asking you because you are a sixth grade band student at J. Mi[redacted]

In this study I will try to learn about what motivates beginning band students to continue in band, or not. To do the study, I will give you a short survey to determine what motivates you. I will also look at some of your school records to see if any might affect your motivation levels.

Participating in this study will not hurt you in any way. Choosing to participate, or not, in this study will not affect your grades. This study may make you consider what motivates you to learn music in band. The reason I am doing this study is so that your band, orchestra, and guitar classes will be more interesting and engaging.

Your parents have been asked to give their permission for you to take part in this study. Please talk this over with your parents before you decide whether or not to participate.

You do not have to be in this study if you do not want to. If you decide to participate in the study, you can change your mind at any time and I will delete the information you provided.

If you have any questions at any time, please ask the researcher.

IF YOU PRINT YOUR NAME ON THIS FORM IT MEANS THAT YOU HAVE DECIDED TO PARTICIPATE AND HAVE READ EVERYTHING THAT IS ON THIS FORM. YOU AND YOUR PARENTS WILL BE GIVEN A COPY OF THIS FORM TO KEEP.

_____ _____

Name of Child (printed) Date

_____ _____

Signature of Investigator Date

(Drew Duncan, Andr[redacted]

Appendix E

Social/Behavioral Research Course Completion Certificate

Appendix F

Social and Behavioral Responsible Conduct of Research Course Completion Certificate

Appendix G

EVC Survey Answer Sheet

Directions

This is not a test. Instead it is a short survey about your attitudes towards your band class. Your responses will help your school learn how to improve these classes. So, please respond openly and honestly. All of your responses will be kept confidential. No one will see your individual answers (not your teacher, not your classmates, not your parents).

1. I think band is important.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

2. I know I can learn the material in band.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

3. I value band.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

4. My band classwork requires too much time.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

5. I believe that I can be successful in band

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

6. Because of other things that I do, I don't have time to put into my band class.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

7. I think band is useful.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

8. I'm unable to put in the time needed to do well in band.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

9. I am confident that I can understand the material in band.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

10. I have to give up too much to do well in band.

Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6

Appendix H

EVC Google Form

Music Motivation Survey

This is not a test. Instead, it is a short survey about your attitudes towards your band class. Your responses will help your school learn how to improve band classes. So, please respond openly and honestly.

* Required

Type your student ID number. *

Your answer

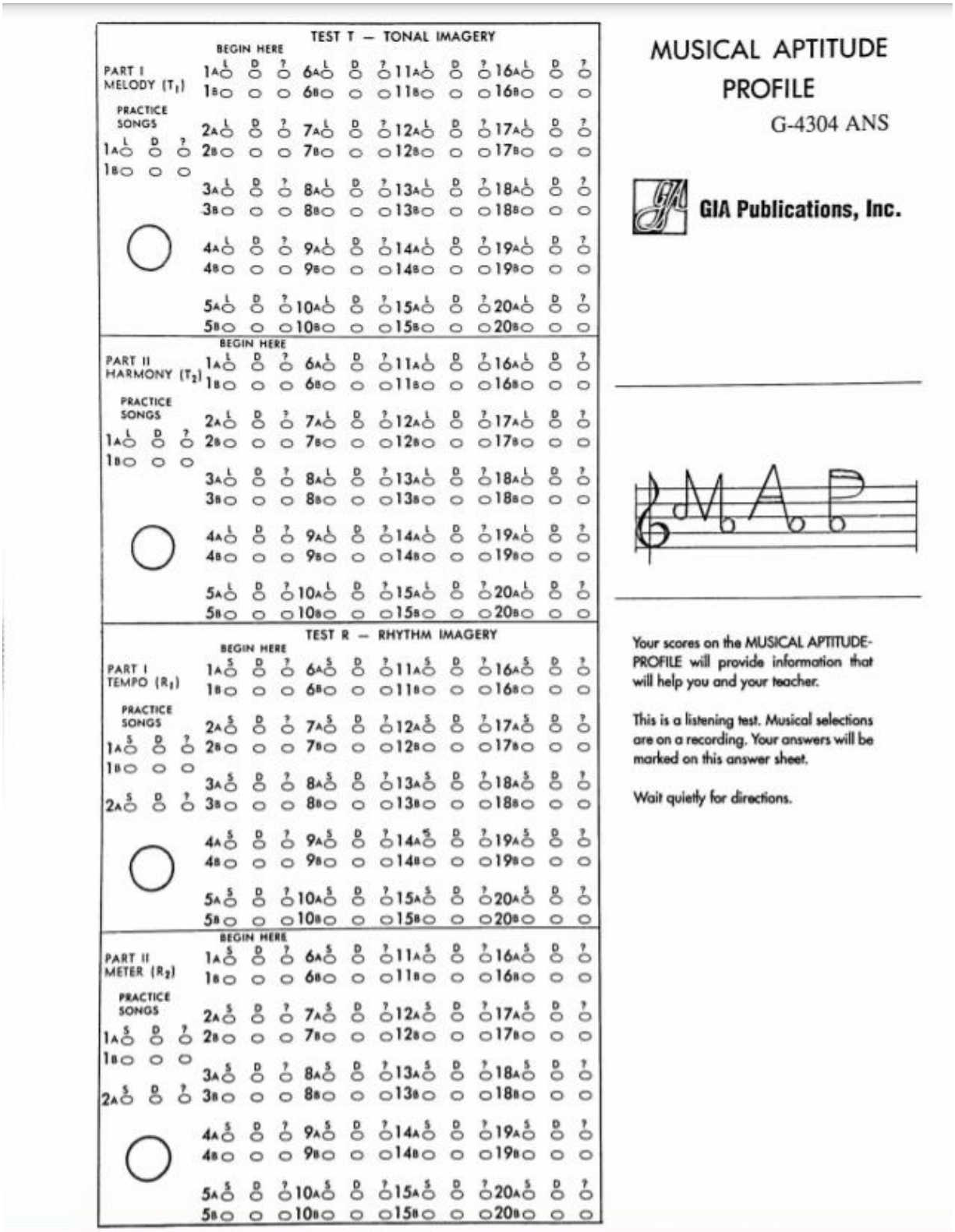
I know I can learn the material in my band class. *

- Strongly disagree
- Disagree
- Slightly disagree
- Slightly agree
- Agree
- Strongly agree

I believe that I can be successful in my band class. *

Appendix I

Musical Aptitude Profile Answer Sheet



TEST T — TONAL IMAGERY

BEGIN HERE

PART I
MELODY (T_1)

PRACTICE SONGS

PART II
HARMONY (T_2)

TEST R — RHYTHM IMAGERY

PART I
TEMPO (R_1)

PART II
METER (R_2)

MUSICAL APTITUDE PROFILE

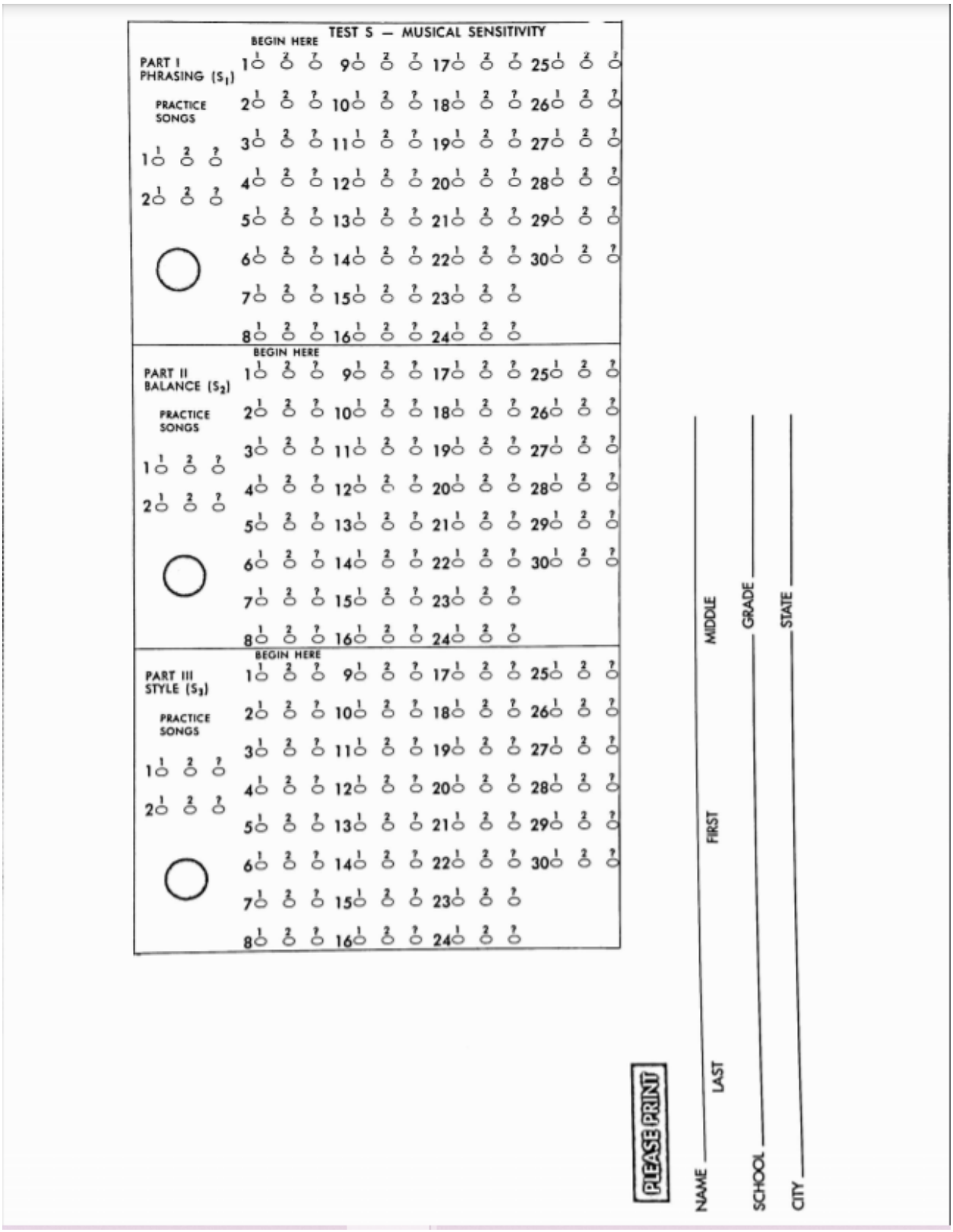
G-4304 ANS

GIA Publications, Inc.

Your scores on the MUSICAL APTITUDE-PROFILE will provide information that will help you and your teacher.

This is a listening test. Musical selections are on a recording. Your answers will be marked on this answer sheet.

Wait quietly for directions.


TEST S — MUSICAL SENSITIVITY
BEGIN HERE
PART I
PHRASING (S_1)
PRACTICE SONGS
BEGIN HERE
PART II
BALANCE (S_2)
PRACTICE SONGS
BEGIN HERE
PART III
STYLE (S_3)
PRACTICE SONGS
PLEASE PRINT
NAME
LAST
FIRST
MIDDLE
GRADE
SCHOOL
CITY
STATE

Appendix J

Musical Aptitude Profile - Meter Google Form

Music Aptitude Profile - METER

* Required

Begin Here

1A *

- S
- D
- ?

1B *

- S
- D
- ?

2A *

- S

Appendix K

Musical Aptitude Profile - Melody Google Form

Music Aptitude Profile - Melody

* Required

Begin Here

1A *

- L
- D
- ?

1B *

- L
- D
- ?

2A *

- L

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