

The Efficacy of Discerning Musical Parts within the Context of an Instrumental Ensemble

A Thesis Presented for the
Master of Music
Degree
The University of Tennessee, Knoxville

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May 2016

ACKNOWLEDGEMENTS

I would first and foremost like to thank my thesis advisor, Dr. Barbara Murphy of the School of Music at the University of Tennessee. She was always available to steer me in the right direction. She saw my determination and established deadlines that set me up for success. I am gratefully indebted to her for her valuable comments and opinions on developing the study for this thesis.

I would also like to thank the other members of my committee, Dr. Loneka Battiste and Dr. Andrew Sigler, for contributing to my research and ensuring this document is nothing less than an excellent representation of the Music Theory Area at the University of Tennessee.

Lastly, I would like to acknowledge Mrs. Cary Springer in the Office of Information Technologies at the University of Tennessee who served as my resident expert on Qualtrics and statistics. She made my first quantitative study an enjoyable one, and helped me understand the power of numbers.

ABSTRACT

The goal of this study was to determine whether students could aurally identify the less dominant inner musical lines of instrumental pieces. An assessment was created through Qualtrics to test this hypothesis with collegiate music majors at the University of Tennessee. In the assessment, students were required to discern a single part from chamber pieces to large symphonies or wind ensemble works by selecting one of four different lines notated from the piece. These lines were transposed to the key and clef of the instrument students were asked to identify. Results were taken from Qualtrics and analyzed through SPSS. The results indicated that identifying the inner lines of instruments was generally easy for music students. Based on an analysis of various parameters in the music, students found texture and timbre to be the parameters that made the voices easier or more difficult to identify.

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CHAPTER 1: Introduction

Aural skills are a crucial component to the careers and lives of all musicians. Musicians need to hear well and to listen intelligently as these abilities play a major part in their every day lives and careers as conductors, teachers, composers, and performers. Music students take a rigorous course of study to attain proficiency in skills such as interval, chord, form, and cadence identification, as well as melodic, harmonic, and often soprano/bass dictation during their collegiate education. A particular proficiency taught in most curricula is harmonic dictation, the transcription of multiple voices presented as a chord progression. For harmonic dictation, a progression of chords is presented typically in a four-part SATB (Soprano, Alto, Tenor, Bass) arrangement. Students are required to notate the soprano and bass voices of the progression and label the chords with the Roman numerals associated with their harmonic function, a process that is often challenging for students. To make it easier, each voice in this type of dictation usually moves in the same rhythm, not providing students the opportunity to transcribe multiple voices moving in different rhythms. However, real music is not always homorhythmic like these examples, but often has simultaneous moving lines with different rhythms. Dictating multiple moving lines is rarely practiced in collegiate music study.

The advantages of hearing and notating multiple voices at once are manifold. First, the ability to hear different parts requires students to listen more in-depth and to understand the functions of the various lines in the music. Second, being able to hear and notate multiple lines prepares performers to direct their attention to the lines around them instead of focusing solely on their individual part. Third, having an awareness of the various parts allows conductors to detect errors in the ensemble. Although the ability to detect errors is very important and has been

researched, very little research has been conducted to determine if students can hear the different lines. The goal of this study is to determine whether collegiate musicians can identify individual musical parts within the context of instrumental compositions, and to understand what makes identifying these lines easy or difficult for students.

The awareness and understanding of inner lines is heavily dependent on a number of factors and musical attributes of the piece such as the textures, timbres, ranges, dynamics, and tempos of the piece. This study hypothesizes that certain factors will make hearing different lines less challenging for participants. For example, students may find it easier to identify a particular line within a polyphonic texture as opposed to a homophonic texture, or students may find it easier to identify a line in a higher range such as the flute or oboe as opposed to a lower alto voice such as the saxophone or French horn.

The results of this research will aid teachers in helping students understand and explain the relationship of a particular musical line to the other lines surrounding it. This research will also help the teachers know whether students can identify individual parts and what aspects of the music make discerning parts easy or difficult. However, it is first imperative to know whether students are able to identify an individual line, especially a line that is not the most prominent one such as an inner, non-melodic line.

In the first chapter of this thesis, I discuss literature and research that is relevant to the acquisition of the ability to identify voices within the context of instrumental ensemble pieces. Specific topics involve preparing the mind for attentive, multi-parametric listening, as well as multi-part dictation, singing, and the development of the aural skills curriculum with multi-voice identification in mind.

The second chapter documents the methodology of the assessment that tested the students' ability to identify inner lines. This chapter includes a description of participants who volunteered for the study and an explanation of the assessment that was developed to evaluate students' ability to identify voices in instrumental ensemble music. A detailed explanation of the musical examples used in this assessment is also provided, as well as a description of the procedure used for the assessment.

The results of the assessment are presented in chapter three. This chapter contains an analysis and comparison of the results among participants, and includes a discussion regarding which musical parameters caused more difficulty for participants as well as participant feedback on each excerpt.

In the final chapter of this thesis, I provide conclusions concerning the implication of the results, especially in relation to college aural skills training. This chapter explains limitations in the study and offers suggestions for further research in student ability to identify voices in instrumental ensemble pieces.

CHAPTER 2: Review of Relevant Literature

Although most aural skills curricula teach students harmonic dictation, some curricula focus on the identification of the chords and the dictation of the soprano and bass voices while completely disregarding the alto and tenor voices. The idea of focusing specifically on inner musical lines is an important skill that is not usually emphasized in the classroom, nor is it a heavily researched topic in the field of music theory pedagogy. No studies could be found that relate specifically to this topic. Related topics were found to be helpful in understanding the difficulty of hearing inner lines. Research that contributes to the ability to identify inner lines includes the concepts of mind training, musical awareness, and a stronger emphasis on commonly taught aural exercises such as polyphonic dictation and singing.

Some music theory pedagogues suggest the significance of preparing the mind as a precursor to the active listening that is required in aural skills. Adolphe (2013) introduces a variety of exercises to enhance creativity and improve the ability to read and imagine music in silence. For example, Adolphe explains a silent exercise on timbral discrimination in a five-step process: 1) hear a major scale in your mind; 2) hear it played very slowly on a trumpet; 3) hear it played on a muted trumpet; 4) hear the first four notes played on a muted trumpet and the last four notes on an oboe; 5) hear each note of the scale played on a different instrument (Adolphe 2013, 31). Adolphe provides exercises similar to this that focus on various musical parameters such as tempo, texture, dynamic, range, pitch, and timbre. He explains, “The musical imagination and the mind’s ear can be improved by practicing the appropriate exercises, just as is typically done with instrumental technique. The primary goal of developing the mind’s ear is to improve the ability to imagine and remember music, to hear music in silence, and to be able to

hear in the mind music that is printed on the page without the aid of instrument” (Adolphe 2013, 2). Developing the skill of mentally engaging in music in complete silence is an excellent way of practicing a type of listening that can be referred to as active listening. Active listening involves being aurally aware of all that is happening in the piece, including the various lines within the piece and how they relate to each other. It is difficult for musicians to process each part simultaneously and have an understanding of how each part functions individually, but musicians should be able to extract individual parts and process them separately. Similar to Adolphe’s active listening, Rogers (2004) discusses mind training, describing it as listening *about* music before listening *to* music. He explains, “Composition and analysis are two of the skills and activities that depend on conceptual knowledge. And most important of all, music reading and meaningful listening are totally dependent on the ability to conceptualize what is heard” (Rogers 2004, 33). This idea of conceptualization without actual visualization of the music itself is an excellent way of defining aural skills. Gordon (1976) refers to this conceptualization of music in the mind as “audiation” and says, “Basic audiation provides the immediate readiness for intelligent listening to music. To read and write music meaningfully, one must be able to *hear* music seen in notational form before it is performed, and to *hear* what one is composing.” (Gordon 1976, 2)

Once the mind is prepared, more extensive listening that goes far beyond passive listening is required to master aural skills, and specifically the ability to identify inner lines. Without diminishing the significance of pitch and rhythm, Pratt (1998) advocates listening for and understanding the often-neglected yet equally significant musical parameters of dynamics, tempo, timbre, texture, and structure, and how to train the ear to discriminate variations within these parameters. He explains that neglecting such parameters in aural skills study, “far from

increasing aural awareness, may actually close ears and minds” (Pratt 1998, 3-4). The acquisition of this multi-parametrical type of musical awareness is the first step to mastering the skill of identifying individual voices. Individual lines in a musical composition differ among these parameters, and these parameters can assist students in identifying the individual lines. For example, in a woodwind quintet, the French horn has a strikingly different timbre than the other instruments (i.e., flute, clarinet, oboe, and bassoon). The characteristic sound of the French horn may aid students in differentiating that voice from the others. Karpinski (2000) expresses a similar opinion to Pratt’s idea of multi-parametric listening, and suggests strategies that aid in the identification and description of these parameters. In his book, *Aural Skills Acquisition*, Karpinski includes a section titled “Identification of Basic Features” in which he addresses each parameter of music individually and discusses exercises to strengthen listening skills within each parameter. To be able to discriminate among various instrumental and vocal timbres, Karpinski suggests beginning with monophonic examples and asking students to identify what instrument is playing, and then progressing to the dictation of melodies played by solo instruments as well as in various combinations of timbres (Karpinski 2000, 13) For example, students might be asked to notate a duet between a clarinet and a horn, demonstrating the students’ ability to differentiate the timbres. All of these musical parameters are crucial contributors to the ability or inability to pick out various parts within the context of an instrumental ensemble. Both Pratt and Karpinski emphasize active listening in order to achieve the desired goal of aural skills: the discrimination of parameters besides just pitch and rhythm.

In aural skills classes, students seem to find listening to several voices at once overwhelming, but there are approaches to strengthening this skill. Tenney (1964) defines two different types of music listening. The first type, he explains, is listening with a textural focus,

which directs the listener's attention to the less essential parts of a more complex texture. Tenney explains that this type of listening can cause a distraction from one of the more important structural features, assuming there is a hierarchy within the elements of the music. The second type of listening Tenney discusses is listening with a parametric focus, or directing the listener's attention to all parameters of musical sound. He explains that, "whereas in earlier music the responsibility for the articulation of musical ideas was mainly given to the pitch-parameter, the other parameters have begun to carry more and more of this responsibility, sometimes even to the extent of replacing the function of pitch altogether" (Tenney 1964, 17) Although Tenney speaks primarily of the application of these different types of listening to 20th-century music, his idea of giving equal focus to all parameters (i.e., texture, timbre, dynamic, range, tempo, pitch, and rhythm) can be applied to discerning musical parts in music of all eras. The identification of individual parts requires students to adopt a parametric focus, similar to the ideas of Pratt and Karpinski, because these parameters are often what cause an individual line to stand out in the music. Based on his experiences, Gregory (1994) advises that multi-part dictations are much easier for students when the timbres are varied as opposed to examples with only one timbre. For example, students find it much easier to distinguish the parts of a mixed woodwind ensemble with contrasting timbres than a more homogenous group such as a string quartet or clarinet ensemble.

Implementing polyphonic dictation early in aural skills classes gives students an introduction to the challenge of listening to more than one part at a time. There are many exercises that will ultimately help develop the skill of hearing various parts in music, but polyphonic dictation may be the most suitable for preparing students for the active listening required for accomplishing a task such as picking out individual parts. White (2002) advocates

for the use of two-part dictation exercises in the aural skills classroom. In these exercises, students are required to notate two competing melodies played concurrently. Karpinski also addresses the significance of polyphonic dictation: “Despite its infrequent implementation, polyphonic dictation is important because it involves modes of listening that can remain otherwise underdeveloped, can function as preparatory skill development that leads to bass line perception, and models quite closely the kinds of rhythmic textural differentiation found in most common-practice-period music” (Karpinski 2000, 111). Listening to multiple voices at the same time allows students to practice discerning each individual voice and teaches them to understand each voice’s relationship to the surrounding voices.

In addition to polyphonic dictation, singing is monumental in the acquisition and development of aural skills, and more specifically the task of identifying individual parts sounding simultaneously. Gordon (1976) places a huge weight on singing as one of the best activities to acquire and develop aural skills. Singing can play a large part in the development of aural skills, as well as musical development in general. Robinson (1996) explains the results of incorporating singing into ensemble rehearsals at the secondary level saying, “Students exposed to singing as a regular component of their instructional program tend to score higher on measures of music achievement, executive skill development (fingering, articulation, bowing, and so forth), attitude, and developmental music aptitude” (18). Similarly, Wolbers (2002) also attributes singing to the development of aural skills and explains that students should be able to truly hear the music they are producing as opposed to only seeing it (38). Singing allows students to conceptualize pitch and melodic intervals, both of which are essential for hearing and identifying lines.

Singing is also one of the most productive methods of improving the ability to audiate and conceptualize written music, which in turn helps students with melodic dictation. Singing requires students to have a solid foundation of pitch. Students who sing in a group setting will see innumerable benefits. Singing in parts (i.e., in groups) offers students a better understanding of harmonic function and improves the ability to hear, understand, recreate, or even improvise harmonies (Junda 1997). Singing in parts also aids in students' understanding of polyphonic singing, which is a key factor in developing the ability to identify the different voices within homophonic textures. Bell (2004) explains her sequential approach to teaching students to improvise harmonies in the choral rehearsal, much of which can be tailored to serve as activities in the aural skills classroom that generates harmonic thinking and understanding. The most basic exercise in her approach introduces students to the different voices within the major chord (root, third, fifth) and at a later level leads to improvisation of harmonies to folk songs and solo improvisation of melodies over blues progressions (Bell 2004, 32). Although sight-singing melodies is very common in aural skills training at the collegiate level, singing in parts is not nearly as common and should be emphasized more in the curriculum in order to heighten students' understanding of polyphonic textures, allowing students to better conceptualize and hear individual parts within multi-voice textures.

Regardless of how the skill of being able to hear parts is developed (e.g., through dictation of multi-part examples or through singing in parts), it is important for students to be able to discern different parts in music, specifically non-dominant parts in the music (i.e., inner parts). The next chapter will describe the assessment that was developed to determine whether students can identify the inner voices of instrumental pieces. It will also provide information on

the specific musical excerpts that were chosen to be used in the assessment as well as the participants who participated in the study.

CHAPTER 3: Methodology

The goal of this study was to determine whether collegiate music students could hear and identify inner musical parts in instrumental pieces and what musical parameters made this task easy or difficult. The musical parameters include voice crossing, texture, timbre, tempo, dynamic, and range. I created an assessment to evaluate the participants' ability to identify a specific line. Each question was followed by other questions asking the participants about whether certain musical parameters made it easier or more difficult to determine their answer.

Participants

The assessment was open to any undergraduate or graduate student at the University of Tennessee pursuing either a major or minor in a music-related field. A combination of 56 undergraduate and graduate students volunteered to participate in the assessment. Of those students, 29 (52%) were male and 27 (48%) were female. The majority of participants were Caucasian (47, 84%), while the remaining participants identified as Asian/Pacific Islander (3, 5%), Multiracial (2, 4%), Hispanic (1, 2%), Black/African American (1, 2%), and Native American/American Indian (1, 2%). One person (2%) preferred not to respond.

The participants' ages ranged from 18-25+. There were 16 participants who were 18 years of age (28.6%), 16 participants who were 19 years of age (28.6%), 6 participants who were 20 years of age (10.7%), 3 participants who were 21 years of age (5.4%), 4 participants who were 22 years of age (7.1%), 3 participants who were 23 years of age (5.4%), 1 participant who was 24 years of age (1.8%), and 7 participants who were 25 years of age or above (12.5%). In terms of class level, freshmen were the largest class represented (24, 42.9%). All other classes

were represented with 12 sophomores (21.4%), 6 juniors (10.7%), 6 seniors (10.7%), and 8 graduate students (14.3%) participating.

Additionally, the population included a range of degree and concentration areas. There were 43 undergraduate students (77%) and 10 graduate students (18%). Most undergraduate students were in the Bachelor of Music (B.M.) in Music Education (19, 33.9%) and B.M. in Performance (15, 26.8%) programs. Other undergraduate degree and concentration areas represented were: B.M. in Sacred Music (1 student, 1.8%), B.M. in Studio Music and Jazz (4, 7.1%), B.M. in Theory/Composition (2, 3.6%), Bachelor of Arts (B.A.) in Applied Music (2, 3.6%). Graduate students were in the following programs: Master of Music (M.M.) in Collaborative Piano (1, 1.8%), M.M. in Choral Conducting (1, 1.8%), M.M. in Instrumental Conducting (1, 1.8%), M.M. in Music Education (1, 1.8%), M.M. in Music Theory (1, 1.8%), and M.M. in Performance (5, 8.9%). Two participants listed a double concentration in music-related fields. Three non-music majors pursuing a minor in a music-related field participated in the study. Their majors were business marketing, electrical engineering, and pre-medicine.

The population represented relatively balanced proportions of a variety of primary instruments: 14 participants played a woodwind instrument (25%), 12 played a string instrument (21.4%), 11 played a brass instrument (19.6%), 10 were vocalists (17.9%), 6 were keyboard players (10.7%), and 3 were percussionists (5.4%).

Stimuli

For this study, I created a web-based assessment using the University of Tennessee's Qualtrics program that tested participants' abilities to identify inner musical lines (see **Appendix A**). Participants were asked to identify a specific part in an excerpt of music. In all, ten audio

excerpts from pieces representing a range of eras, genres, textures, and instrumentation were used for the assessment. The ten musical examples used in the study include excerpts from chamber music as well as symphonies, string orchestra, and wind band literature. A comprehensive list of the excerpts can be found in **Table 1**. Consideration for selection included the need for a variety of textures and timbres, as these two characteristics were thought to be the most helpful when identifying different lines.

Table 1: list of excerpts used

Composer	Title	Measures	Instrumentation	Instrument/voice to Identify
Adolphe Deslandres	<i>Trois Pieces en Quintette, Andante</i>	9-15 (7 measures)	Woodwind quintet (flute, clarinet, oboe, horn, bassoon)	French horn / alto
Wolfgang Amadeus Mozart	Symphony No. 23 in D, K. 181, Allegro spiritoso	31-39 (9 measures)	Orchestra	Cello/bass / bass
Igor Stravinsky	Septet, I	1-7 (7 measures)	Septet (clarinet, bassoon, piano, violin, viola, cello, bass)	Bassoon / bass
Robert Beaser	Brass Quintet, I. <i>Little Requiem with Fanfares</i>	99-107 (9 measures)	Brass quintet (two trumpets, horn tenor trombone, bass trombone)	Tenor trombone / tenor
Leonard Bernstein	<i>Symphonic Dances from West Side Story</i>	315-322 (8 measures)	Orchestra	English horn / alto
Ron Nelson	<i>Rocky Point Holiday</i>	6 after reh. 23- reh. 24 (12 measures)	Wind band	Baritone / tenor
Vincent Persichetti	Divertimento for Band, Op. 42, Burlesque	31-39 (9 measures)	Wind band	Euphonium / tenor
Pyotr Ilyich Tchaikovsky	Serenade for Strings in C Major, Op. 48, Pezzo di Forma di Sonatina	23-28 (6 measures)	String orchestra	Cello / tenor
Percy Aldridge Grainger	<i>Shepherd's Hey</i>	50-57 (8 measures)	Wind band	Mallet percussion / soprano
Edward Elgar	String Quartet in E minor, Op. 83, Allegro moderato	Rehearsal 4-5 (8 measures)	String quartet (violin, viola, cello, bass)	Viola / alto

Examples that used similar timbres were the excerpts by Beaser, Elgar, Mozart, and Tchaikovsky (i.e., each of these excerpts was written for instruments within the same instrument family). Beaser's Brass Quintet, *Little Requiem with Fanfares* was composed for a brass quintet comprised of two trumpets, a French horn, a tenor trombone, and a bass trombone. Students are prompted to listen for the tenor trombone voice, which may be difficult to distinguish among the imitative interplay of the similar-sounding brass voices.

The string quartet by Elgar is written for a typical string quartet (two violins, viola, and cello), and students are asked to identify the viola part. The similar string timbres as well as the lower tessitura of the viola might make the viola part more challenging to discern.

Mozart's Symphony No. 23 in D is scored for full orchestra, but participants are asked to identify the cello/bass part in a section during which only the strings are playing. Although bass line dictation is much more common than dictation involving alto and tenor voices, this example may be challenging as the bass line is similar to the rhythm and contour of the viola line.

The excerpt from Tchaikovsky's Serenade for Strings in C Major, Op. 48 also exhibits similar timbres as the instrumentation is all strings. However, in this example, the tempo is slower and the texture is homogenous, which may make it less challenging for participants.

Some examples prompted participants to identify an instrument that was dissimilar in timbre to the others. Those excerpts include the Deslandres, Grainger, Bernstein, Nelson, and Persichetti. *Trois Pieces en Quintette* by Deslandres is scored for woodwind quintet (flute, clarinet, oboe, French horn, and bassoon). Participants were asked to identify the soaring French horn line against the woodwind voices.

Grainger's *Shepherd's Hey* is another excerpt with an extreme timbral difference. Participants were asked to identify the mallet percussion part played by the bells and xylophone.

In this piece, the brassy and percussive bells can be distinguished from the wind instruments of the piece. The wind parts used in this excerpt originally had staccato markings and grace notes, but these were taken out to better replicate an idiomatic mallet percussion part. Although the mallet part changes from bells to xylophone midway through, the mallet part was notated all within the same octave as it is in the score, despite the bells sounding an octave higher than written.

In Bernstein's *Symphonic Dances from West Side Story*, participants were prompted to identify the distinctive timbre of the English horn. The excerpt was thinly textured with the English horn line moving against stagnant voices.

In Persichetti's *Divertimento for Band*, Op. 42, participants were asked to identify the melodic line of the euphonium, which is surrounded by embellishments and flourishes in the woodwinds. The part is doubled in the lower woodwinds and the combined timbres may make this excerpt deceptively difficult.

Participants were also asked to pick out the tenor part of *Rocky Point Holiday* by Ron Nelson by listening for the baritone horn part. The baritone part is doubled in the English horn, but can still be identified by its own characteristic timbre.

Texture was also a consideration in choosing the examples. Pieces were chosen with homophonic and polyphonic textures. Three excerpts exhibited homophonic textures: the excerpts by Mozart, Tchaikovsky, and Persichetti. These examples may be more difficult since the voices of each excerpt have roughly the same rhythms. In the Persichetti excerpt, the euphonium and lower woodwinds double the melody while the other voices support the melody with flourishes and other ostinato accompaniment figures. This voicing may make the euphonium easier for students to identify. The excerpts that have polyphonic textures were the

excerpts by Deslandres, Beaser, Nelson, Grainger, Bernstein, and Elgar. It was hypothesized that students may find it easier to identify the different voices of these excerpts since the rhythms differ.

Stravinsky's Septet was removed from the results since several errors were found in the notation of the excerpt after the assessment was given. The excerpt is scored for clarinet, bassoon, French horn, piano, violin, viola, cello, and bass. Participants were asked to identify the bassoon line in the first seven measures of the piece. Initially, the question asked students to identify the horn part; therefore, the key and clef of the excerpt was placed in the written key of the horn part and was not changed when the question was changed to ask for the bassoon part. Even though intervallic and rhythmic content were still accurate, it was thought that the errors in the notation could have caused a discrepancy in the results.

Examples were also chosen that had lines in voices that are harder to distinguish such as the alto, tenor, and bass voices to determine if these ranges made a difference in the students' ability to pick out parts. All together, participants were asked to identify one soprano voice, three alto voices, four tenor voices, and two bass voices.

Phrase lengths determined the length of the excerpts; the final length of the examples ranged from six to twelve measures. The sounds clips of the excerpts were nine to thirty seconds in length due to tempo variations among the excerpts. Longer excerpts (i.e., thirty seconds) typically had a slower tempo marking, and shorter excerpts (i.e., nine seconds) had a faster tempo marking.

There were two screens for each excerpt. A typical first screen is shown in **Figure 1**. At the top of the screen is a countdown timer. Students had a two-minute time limit to listen to each excerpt before the follow-up questions related to the excerpt were automatically shown (i.e., the



Wolfgang Amadeus Mozart - Symphony No. 23 in D, K. 181: I. Allegro spiritoso



Which of the following staves shows the cello/double bass/cello part that was played in this symphony?



Figure 1: example of excerpt layout

page turned). In aural skills classes, students are typically given a limited amount of hearings. Since it was not possible to specify the number of times students could listen to the example in Qualtrics, a time limit for the page was used instead. Two minutes was chosen for each example since this time limit allowed students to listen to each example anywhere from three to five times depending on the time length of the example.

The title and composer of the piece is under the timer. Audio for each excerpt was uploaded as an mp3 file and shown onscreen as a play bar students could click to hear the example. Below the play bar is a prompt for which particular instrument students were to listen for in the excerpt, followed by four different lines from the piece notated on the staff. To avoid students using a process of elimination based on the presented notation, each musical line was transposed to the clef and written key of the instrument participants were told to listen for. For example, when participants were asked to identify the viola part, all four notated lines were written in alto clef. Additionally, the staves were not labeled as to what instrument played each

line, and the parts were not presented in score order. Since most excerpts were taken from music involving more than four instruments, the instruments chosen to serve as the incorrect choices were ones that played parts that were either competitive to or similar to the instrument that was requested for identification.

Participants read the directions, listened to the example, and chose their answer from the four lines of musical notation. Then a second page (see **Figure 2**) was shown on which the participants were asked to rate on a scale from “Very Easy” to “Very Difficult” the effect six musical attributes had in contributing to their answer. Students also had the option to select “N/A” for any parameter they may have deemed not applicable in identifying the instrument. The six musical attributes were timbre, voice crossing, range, tempo, texture, and dynamics. Timbre refers to the characteristic sound of each individual instrument, which may be useful in helping participants identify the difference between the various voices of each excerpt.

Indicate below whether each of the following characteristics made it easier or more difficult to identify the cello/double bass part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to pick out the cello/double bass part? (Describe below)

Figure 2: example of questions following each excerpt

Texture refers to how each part relates melodic, rhythmically, and harmonically to each other. For example, homorhythmic texture occurs when all parts have the same or highly similar rhythms. Conversely, polyphonic texture combines multiple melodic lines that create harmony, and each part can differ rhythmically from the others. Another common texture is melody and accompaniment (homophony), in which one voice provides the main melodic material and the other voices comprise an accompaniment that supports the melody with harmony.

Voice crossing occurs when a lower voice extends into a range higher than an upper voice or vice versa. Voice crossing only happens in two of the excerpts. Range refers to the distance between the lowest and highest playable notes on a particular instrument, and relates to the category a particular instrument falls within (i.e., soprano, alto, tenor, bass). Participants may consider range helpful in identifying the approximate location of the instrument's line in correlation to the other lines. Tempo refers to the speed at which the music occurs. Dynamic refers to an instrument's loudness or softness. After rating the main parameters, participants could also write in comments identifying any other musical parameters that made the identification of the particular line easy or difficult.

Each excerpt and its follow-up questions were randomized so that all participants would not receive the questions in the same order.

Procedure

After Institutional Review Board (IRB) approval, a recruitment email was sent to all University of Tennessee School of Music undergraduate students through the Blackboard course management system, and to all graduate students through Constant Contact. The email (see

Appendix B) urged those interested in participating in the study to contact the researcher.

Specific blocks of time were set up throughout the week for participants to take the assessment. Participants signed up for a 45-minute time slot through email. Participation in the assessment was voluntary; no incentive was offered. The assessments were administered individually on iMac desktop computers in the Natalie L. Haslam Music Center ear-training lab under the researcher's direct supervision. Students used headphones to listen to the examples. If students came without headphones, they used headphones from the lab.

Participants were emailed the link to the assessment which they opened in the Safari web browser to access the assessment. Before beginning the assessment, I explained the procedure and instructions for the assessment. Specific information relayed to each participant included the goal and purpose of the assessment, what to expect during the assessment, how the questions were set up, and how the music examples were chosen from the score. I explained that the voices in each score excerpt were transposed into the written key of the instrument they were prompted to identify. I also answered any questions participants had prior to beginning the assessment. Participants were asked to raise their hand if they had any questions or problems during the assessment.

Data from the assessment was collected through Qualtrics and downloaded to a spreadsheet to be analyzed. The results of the assessment will be discussed in the next chapter.

CHAPTER 4: Results

The goal of this research was to determine whether or not collegiate music students could identify the inner voices of excerpts that had varied genres, textures, and instrumentation. Secondly, the research attempted to learn whether specific parameters of the music made the identification of the part easier or more difficult.

An assessment was given to 56 undergraduate and graduate music students. The assessment consisted of 10 excerpts from various genres of music (see Table 1 above). Errors were found in the notation of a few of the excerpts after the assessment was given to participants. The excerpt by Stravinsky was removed from the results due to a number of issues in the notation of the excerpt that may have caused inaccurate results. However, the errors in other examples were not substantial enough to affect the results and so these excerpts were kept in the analysis of the data.¹

Data was collected from Qualtrics, downloaded to a spreadsheet, and analyzed through SPSS. Overall, participants were able to identify the inner lines of the excerpts successfully. Out of the ten musical excerpts that were included in the assessment, seven excerpts resulted in at least an 80% success rate among participants (see **Table 2**).

¹ In the Deslandres excerpt, there is an added slur in the oboe part going from the last note of the fourth measure to the first note of the fifth measure. Also, a slur is missing in the third measure of the French horn part in the same excerpt, and a tie is missing in the fourth measure in the same part. In the Beaser brass quintet, the last note of the horn part should be C-sharp instead of a C-natural. In Nelson's *Rocky Point Holiday*, a tenuto mark is missing on the first beat of the eighth measure in the euphonium part. Also in this excerpt, the time signature was left off. It should be marked as 4/4.

Table 2: success rate of each excerpt

Excerpt	Percentage Correct	Average of Means
Mozart	98.2%	1.91
Deslandres	94.6%	1.62
Tchaikovsky	92.9%	2.02
Grainger	89.3%	1.97
Bernstein	83.9%	2.12
Nelson	82.1%	1.99
Beaser	71.4%	2.45
Persichetti	55.4%	2.18
Elgar	42.9%	2.80

Participants were asked to rate how certain musical parameters (i.e., tempo, texture, timbre, dynamic, range, and voice crossing) affected their ability to identify the part. Descriptives of the variables determined which parameters made it most difficult for participants to identify the inner lines. The results reveal that participants indicated a variety of reasons they found it easy or difficult to identify voices within certain excerpts. The difficulty scale of the different musical parameters was converted to a scale of 1-4 (1=very easy; 2=easy; 3=difficult; 4=very difficult). Participants were also given the option to select “N/A” for any parameter that they did not deem applicable in selecting their answer, but this answer was removed from the results to indicate an accurate mean. For statistical purposes, any parametrical mean higher than 2 is considered an aspect that made the excerpt more difficult, with anything above a 3 very difficult. Additionally, all parametrical means have been averaged together to get an average of the means to determine the overall difficulty of the excerpt (**Table 2**).

It is important to note that students seemed to be confused about the meaning of “voice crossing.” Voice crossing was the parameter receiving the highest mean in most excerpts (i.e., was the factor that made it hardest to hear a particular line in an example). Since voice crossing only existed in two excerpts, it is assumed that participants confused the meaning of voice

crossing with voice doubling, when two instruments are playing the same part in unison or octaves. There also seemed to be some confusion on whether “Tempo” was the same as rhythm. Of course, it is not; tempo is defined as the speed at which a musical piece is played or sung.²

The easiest example for participants was the excerpt from Adolphe Deslandres’ *Trois Pieces in Quintette*; most participants (94.6%) correctly identified the specified French horn line. Most parameters made hearing the line easy since mean scores from the analysis ranged from 1.27 to 1.81, with the overall mean of 1.62 well below the difficult level (see **Table 3**). In the optional textbox for additional feedback on the difficulty of the excerpt, many participants wrote that their successful identification of the French horn part was due to the distinct brassy timbre of the French horn against the woodwind voices, which is evidenced by the fact that timbre received the lowest mean (1.27).

Table 3: descriptive statistics of Deslandres’ *Trois Pieces en Quintette*

	Minimum	Maximum	Mean	Std. Deviation
Texture	1	4	1.81	.770
Voice crossing	1	3	1.73	.724
Dynamic	1	3	1.70	.695
Tempo	1	2	1.64	.489
Range	1	3	1.59	.574
Timbre	1	3	1.27	.522
Average of means			1.62	

In the excerpt from Mozart’s Symphony No. 23, K. 181, only one person (1.8%) confused the cello/double bass voice for the viola part, while the other 55 (98.2%) correctly identified the cello/double bass voice. The parametrical means ranged from 1.64 to 2.07 with an

² "Tempo," Merriam-Webster.com, accessed March 23, 2016, <http://www.merriam-webster.com/dictionary/tempo>.

overall mean of 1.91, only slightly higher than the Deslandres excerpt and still below the middle mark (**Table 4**). Five participants wrote that they found their answer by listening to the rhythm of the cello/double bass voice, even though the rhythm was exactly the same as the violas and differed only slightly from the violins. Seven participants credited the low timbre as being helpful in identifying the voice while one person expressed that cello was their primary instrument, helping them identify the timbre. Two participants mentioned that hearing the walking bass line made it easy. Another person explained that the timbre made it more difficult for them to hear the cello/double bass line saying, “The cello/bass part blended with the other string sounds making it more difficult to distinguish.” One person explained that the balance seemed off in their headphones and that this caused difficulty identifying the cello/bass part.

Table 4: descriptive statistics of Mozart’s Symphony No. 23 in D, K. 181

	Minimum	Maximum	Mean	Std. Deviation
Texture	1	4	2.07	.789
Voice crossing	1	3	2.04	.774
Timbre	1	4	2.00	.990
Dynamic	1	4	1.95	.815
Tempo	1	3	1.75	.568
Range	1	4	1.64	.729
Average of means			1.91	

Identifying the mallet percussion part of Percy Grainger’s *Shepherd’s Hey* was also easy; participants had an 89.3% success rate for identifying the part. The largest number of participants that answered incorrectly (8.9%) chose the third clarinet part most likely due to the similarity of the contour of the lines in the excerpt. One person (1.8%) selected the first clarinet part. These three parts had the exact same rhythm and similar contours, which makes sense as to why

participants may have selected the wrong part. Many participants indicated in their comments that timbre made it easy to hear the part itself, but choosing the correct notation among the choices was difficult. Two people were confused and challenged when the mallet percussion part switched from the bells to the xylophone halfway through the excerpt. One person commented that “the leaps and the return to tonic at the end” helped in selecting the correct choice. Six participants used the melodic intervals of the line to identify the voice and nine used timbre. The average of the parametrical means was 1.97, which indicates that identifying the correct part was fairly easy for participants (**Table 5**).

Table 5: descriptive statistics of Grainger’s *Shepherd’s Hey*

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	2.36	.826
Texture	1	4	2.06	.932
Tempo	1	3	2.00	.770
Dynamic	1	3	1.97	.788
Range	1	4	1.79	.798
Timbre	1	3	1.62	.765
Average of means			1.97	

For the excerpt from Ron Nelson’s *Rocky Point* Holiday, the participants were asked to identify the baritone part which 82.1% of participants were able to do correctly. Only a few participants chose the other instrumental parts: oboe (5.4% selected), bassoon (3.6% selected), and glockenspiel (8.9% selected). The musical parameter that was predicted to be challenging for the participants was the mixing of the timbres of the baritone and English horn. In this excerpt, the oboe is playing melodic material and the baritone and English horn are doubling a countermelodic line. The clarinets, bassoons, vibraphone, and harp provide different rhythmic ostinatos. The glockenspiel enters with a countermelody similar to the baritone and English horn

in measure five. Timbre received the lowest mean of 1.85 (see **Table 6**), indicating that participants thought timbre made it easier to hear the baritone horn. Participants provided many different comments for this excerpt: two participants thought the baritone line sounded more like a French horn, and three participants admitted to being unsure of what a baritone sounds like. Four participants found their answer by the rhythm of the baritone.

Table 6: descriptive statistics of Nelson's *Rocky Point Holiday*

	Minimum	Maximum	Mean	Std. Deviation
Tempo	1	4	2.26	.999
Voice crossing	1	4	2.00	.795
Dynamic	1	4	2.00	.742
Texture	1	4	1.96	.824
Range	1	4	1.86	.756
Timbre	1	4	1.85	.878
Average of means			1.99	

Identifying the cello line, which serves as the bass voice, in the string orchestra excerpt from Tchaikovsky's *Serenade for Strings in C Major*, Op.48, was particularly easy despite the similarity of timbres in this excerpt. For this example, 92.9% of participants were able to successfully identify the cello part. In their comments, three participants explained that the similar timbres made it difficult for them to identify the viola part. Of those who chose an incorrect part, 5.4% (three people) selected the first violin part and 1.8% (one person) selected the viola part. The confusion between the cello and first violin made sense since the contour of the first violin part was very similar to the cello part (see **Figure 3**). The parametrical means of this excerpt averaged to 2.02, in the middle of the scale (see **Table 7**). The parameter with the highest mean was once again voice crossing (2.40). Since true voice crossing was not a factor in this excerpt, it is assumed that participants were unclear on the definition of voice crossing.

Other comments revealed new parameters that helped participants identify the line. Five participants attributed their ability to hear the cello part to the altered G# on the downbeat of the fourth measure, while three participants identified the part by its rhythm. One person noted that they had played the piece before.



Figure 3: notation of Tchaikovsky excerpt (parts shown in order given on assessment)

Table 7: descriptive statistics of Tchaikovsky's Serenade for Strings in C, Op. 48

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	2.40	1.003
Timbre	1	4	2.10	.891
Texture	1	4	2.08	.895
Dynamic	1	3	2.03	.774
Range	1	4	1.91	.708
Tempo	1	3	1.62	.622
Average of means			2.02	

For the excerpt from Leonard Bernstein's *Symphonic Dances from West Side Story*, 83.9% of participants correctly identified the English horn line within the thinly textured excerpt. Of those that did not answer correctly, 14.3% of participants confused the English horn line for the clarinet part and 1.8% (one person) selected the second flute part. It was assumed that timbre might have played a part in the participants' ability to identify the line since, in this section, the only instruments playing are the flutes, oboes, English horn, clarinets, strings, and percussion,

and the only instruments with moving lines are the flutes and the English horn. Timbre did seem to make it easier for participants to identify the English horn part since it received the lowest mean of difficulty (see **Table 8**). However, the student comments were mixed on whether timbre helped or not. Six participants wrote that the distinctive timbre of the English horn allowed them to identify the line, while four participants explained that they had a difficult time differentiating the English horn from the oboe. The English horn and oboe may have sounded similar since the English horn is playing at the higher end of its range, and range received a higher mean of 2.30. The average of the means for the different parameters was 2.12, almost the middle of the spectrum of easiest (1) to most difficult (4). Voice crossing was still the highest parametrical mean (2.44) despite the absence of voice crossing in this excerpt, further proving that participants were unclear on the definition of voice crossing.

Table 8: descriptive statistics of Bernstein's *Symphonic Dances from West Side Story*

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	2.44	.821
Range	1	4	2.30	.795
Dynamic	1	4	2.22	.797
Texture	1	4	2.09	.830
Timbre	1	4	1.95	.891
Tempo	1	3	1.73	.674
Average of means			2.12	

The excerpt from Persichetti's *Divertimento for Band*, Op. 42 was particularly difficult for participants. Only 55.4% of participants correctly identified the euphonium part, while 35.7% selected the third clarinet part, which was highly similar to the rhythm and contour of the euphonium part. Of the remaining participants, 7.1% selected the alto saxophone line and 1.8%

(one person) selected the flute line. Errors were found in the notation of the excerpt after the assessment was administered. Participants were asked to identify the euphonium part in this excerpt, but there were wrong pitches in the eighth measure. The pitches notated are Ds and Gs, but should be Cs and Fs in this measure (see **Figure 4**). Additionally, in the bottom line of music (played by the alto saxophones), the As and Bs should have been flat throughout. It was thought that these errors may have affected the results, but the analyses were re-run without the Persichetti excerpt and the overall results of the assessment were not affected by the errors. In addition, no comments indicated that any participant was confused by the errors in the notation. Therefore, the excerpt was left in the results. The parametrical means for this example ranged from 1.90 to 2.58, and the average of these means was 2.18 (see **Table 9**). No voice crossing was present in this excerpt despite it having the highest mean indicating once again that participants must have again thought that doubling of voices was voice crossing. Four participants said the timbre made it difficult for them to identify the part, and five said they did not know what a euphonium sounds like. Three people said the rhythm of the euphonium line helped them identify the part. Two people said the contour helped them identify the euphonium part. One person said the range of the instrument helped them identify the part.

Robert Beaser's Brass Quintet, *Little Requiem with Fanfares*, caused challenges for the participants with only 71.4% of participants correctly identifying the tenor trombone line. This excerpt was predicted to be difficult due to the complexity of the texture as well as the timbral similarities of the voices. The trumpets play the melodic material while the horn and tenor trombone provide an imitative rhythmic accompaniment. The horn part was expected to confuse participants due to the rhythmic and intervallic similarities between it and the tenor trombone part but, interestingly, the highest number of incorrect answers was for the melodic line of the



Figure 4: excerpt from Persichetti's Divertimento for Band, Op. 42

Table 9: descriptive statistics of Persichetti's Divertimento for Band, Op.42

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	2.58	.881
Texture	1	4	2.36	.764
Dynamic	1	4	2.25	.841
Range	1	4	2.07	.751
Timbre	1	4	1.94	.785
Tempo	1	3	1.90	.651
Average of means			2.18	

first trumpet part. 16.1% of participants confused the tenor trombone line with the first trumpet part, while 8.9% selected the French horn part and 3.6% selected the second trumpet part. The musical parameter that participants marked as being the most challenging was voice crossing with a high mean of 2.86 (see **Table 10**). Participants wrote in a number of different reasons for their response. Five participants said the similarity of timbres made it challenging for them to identify the tenor trombone part, and three participants admitted to not knowing what a tenor

trombone sounds like. Three participants explained that the rhythm of the line ultimately helped them identify the line. The rhythm of the tenor trombone part had short percussive grace notes that helped separate it from the melodic trumpet parts (see **Figure 5**). Four participants either played the trombone or were familiar with the piece, helping them distinguish the tenor trombone part.

Table 10: descriptive statistics of Beaser's Brass Quintet

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	2.86	.713
Texture	1	4	2.58	.839
Timbre	1	4	2.46	1.004
Range	1	4	2.38	.777
Dynamic	1	4	2.30	.765
Tempo	1	4	2.14	.803
Average of means			2.45	

The image displays a musical score excerpt for a brass quintet. The top system features four staves: Trumpet 2, Horn in F, Trumpet 1, and Trombone. The bottom system continues the music with four staves. The notation includes various musical symbols such as notes, rests, slurs, and dynamic markings like *ff*, *f*, *sfz*, and *sf*. The key signature has one sharp (F#), and the time signature is 4/4.

Figure 5: excerpt from Beaser's Brass Quintet

Beaser BRASS QUINTET
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Edward Elgar's String Quartet in E Minor, Op. 83 proved to be the most difficult excerpt for the participants. Only 42.9 percent of participants successfully identified the viola line. The incorrect answers were split among the other choices: 30.4% selected the second violin line, 23.2% selected the first violin line, and 3.6% selected the bass line. In this excerpt, all of the voices play an independent line. The viola occasionally joins the second violin part an octave below, but mostly remains independent. The mean for each musical parameter was above 2.5 (See **Table 11**), signifying that participants thought all parameters contributed to the difficulty of identifying the viola part in this excerpt. The comments expressed a wide variety of feedback regarding what participants found to be easy/difficult. All comments are listed in **Table 12**. Many participants expressed difficulty in differentiating the viola timbre, while some said that the range of the viola made it difficult to hear. One participant noticed that one of the lines went beyond a viola's range, thus helping them eliminate that voice.

Table 11: descriptive statistics of Elgar's String Quartet in E Minor, Op. 83

	Minimum	Maximum	Mean	Std. Deviation
Voice crossing	1	4	3.00	.744
Texture	1	4	2.90	.799
Dynamic	1	4	2.80	.853
Timbre	1	4	2.78	.945
Range	1	4	2.75	.806
Tempo	1	4	2.58	.945
Average of means			2.80	

Table 12: feedback following the Elgar excerpt

Comments
<i>Timbre</i>
I was extremely difficult to pick the viola out of all of the strings because they all sounded very similar in timbre and the instruments were playing complex pieces. Trumpet.
The piano espressivo helped distinguish the viola timbre and helped me to focus on the line and hear it's alto range throughout the complicated texture, voice-crossing, and overall movement of the piece.
The viola and the cello doubling were very hard to distinguish especially when the Violin 2 went into the lower range. Thankfully the timbre of the viola has a distinct sound and it became noticeable in the latter half of the example.
<i>Texture</i>
The texture made it easier in some ways because different instruments were brought out at different times, but it made it harder when the viola was not brought out.
<i>Range</i>
It was harder for me to find the viola part because the violin part was not in a range that was out of what a viola can play, so I couldn't use process of elimination the dismiss the violin part.
The viola part was harder to identify in this excerpt because of it's range against the other parts. I wasn't sure of what could be the viola part versus what could be possibly a second violin part because of the range.
<i>Dynamics</i>
The part where the viola gets louder and comes in to prominence in the second phrase the viola was playing a similar part to the cello and only became obvious when it played the louder dynamic halfway through.
<i>Rhythm</i>
Had to track the rhythm. Could not clearly hear the viola voice until around half-way through the excerpt then I double checked the beginning to be sure.
Part doubling made it difficult to identify at first; however the rhythm in later sections is what gave it away.
<i>Melodic Content</i>
The melodic and harmonic lines were passed around the entire string section.
<i>Uncertainty</i>
I couldn't really hear the viola part at all.
I was not sure what a viola sounds like, but I know that it is the second highest sound string instrument other than the violin, and I think I heard it when it jumped that large interval.
I'm guessing on this one
Not sure what a viola sound like.
This one was extremely difficult, but unlike the one with the invisible bassoon part, I know this had viola, I just couldn't figure out which of the two voices it was,

One-way analyses of variance (ANOVA) were performed to determine if there was a relationship between the amount of questions answered correctly and demographic information—gender, major concentration, primary instrument, and the amount of years participants have played their instrument. The major concentration areas were separated into three main categories: Music Education majors, Music Performance majors, and other majors (i.e., B.M. in Sacred Music, Studio Music and Jazz, and Music in Theory/Composition; M.M. in Applied Music, Collaborative Piano, Choral Conducting, Instrumental Conducting, Music Theory). The results of the ANOVAs (see **Tables 13, 14, and 15**) showed that there were no differences between any groups ($p = .606$ for gender, $p = .229$ for major concentration area, $p = 0.44$ s for primary instrument family). There was not enough ethnic diversity to compare the results in that category.

Table 13: group statistics; gender

	N	Mean	Std. Deviation	Std. Error	Sig.
Male	29	7.2069	.97758	.18153	
Female	27	7.0000	1.20894	.23266	
					.606

Table 14: group statistics; major

	N	Mean	Std. Deviation	Std. Error	Sig.
Music Education	20	6.8000	1.28145	.28654	
Music Performance	20	7.3500	.93330	.20869	
Other Music major	13	7.3077	.94733	.26274	
Total	53	7.1321	1.09259	.15008	
					.229

Table 15: group statistics; primary instrument

	N	Mean	Std. Deviation	Std. Error	Sig.
Woodwind	14	7.1429	1.02711	.27451	
Brass	11	7.6364	.92442	.27872	
Percussion or Keyboard	9	6.8889	1.26930	.42310	
String	12	6.8333	1.40346	.40514	
Voice	10	7.0000	.66667	.21082	
Total	56	7.1071	1.09010	.14567	.442

Participants were also asked about their experiences with conducting ensembles to see if this variable made a difference in their abilities to identify inner parts. Of the 56 participants, 31 participants had experience conducting an ensemble. A one-way analysis of variance (ANOVA) was run on results of conductors vs. non-conductors to see if there was any statistical difference between the scores of the two groups. The results showed no significant difference ($p = .209$) between the groups (see **Table 16**).

Table 16: group statistics; conducting experience

	N	Mean	Std. Deviation	Std. Error	Sig.
Conducting experience	31	7.1290	.95715	.17191	
No conducting experience	25	7.0800	1.25565	.25113	
					.209

Overall, participants were able to identify the different parts they were asked to identify in the assessment. The results showed no significant difference in scores based on the participants' gender, major, instrument, or conducting experience. The next chapter will discuss the implications of these results.

CHAPTER 5: Discussion

The goal of this study was to determine whether or not collegiate music students can identify the inner lines of instrumental works. The results showed that students were able to discern the musical parts much better than expected considering this task is not actively taught in most aural skills curricula. A secondary research question was whether there were specific musical parameters that made the identification of parts easier or more difficult for the participants. The results imply that, while students can typically identify the various voices of works with different timbres and simpler textures, it is more difficult to identify voices with similar timbres and more complex polyphonic textures. Participants struggled more with the excerpts that involved highly similar timbres (e.g., excerpts from Robert Beaser's Brass Quintet and Edward Elgar's String Quartet in E Minor) than with excerpts that had very different timbres (e.g., the excerpt from Deslandres' *Trois Pieces en Quintette*).

Participants were successful at identifying lines in excerpts with homophonic textures and simpler polyphonic textures. Excerpts that had more complex polyphonic textures (i.e., examples in which all the voices had competitive moving lines) caused the most challenges for the participants. In some cases, students were still able to discern the lines of polyphonic textures when the timbres were different, but the combination of similar timbres and complex textures made those excerpts the most difficult for participants to identify the individual lines, evidenced by the very low success rate (42.9%) of the excerpt from Elgar's String Quartet in E Minor, Op. 83.

More research needs to be conducted, however, on the identification of inner parts. The ten excerpts of my assessment were intended to represent a wide spectrum of difficulty for the

participants, but the results indicated that the questions seemed to be too simple. Further study using only excerpts with a wider range of difficulty and with similar timbres or complex textures would be useful in determining whether or not music students can identify inner voices on a case-by-case basis.

The assessment was only given to music students at the University of Tennessee School of Music. In order to get a more accurate idea of collegiate music students' ability to identify inner voices, the assessment should be given to a larger population of students from several schools of music around the nation. Only then can the results be generalized and can music theory faculty determine what approach needs to be taken in order to address the needs of the students.

It is important that students are able to pick out parts aurally. The ability to identify individual lines should be incorporated into the aural skills curriculum. Most colleges typically have a four-semester sequence of aural skills classes that are required for music majors, with some schools requiring students to take an additional fifth semester. Instructors can incorporate the identification of various musical lines into the already existing curriculum, increasing the difficulty of the task as the sequence progresses. For example, by the end of the first semester of aural skills, students could be asked to dictate both voices of a short duet in similar or different timbres. Instructors might use harmonic dictation examples with different instruments so students can focus on identifying the individual timbres. Later, instructors might use examples with the same or timbres to slightly increase the difficulty. As the sequence of courses progresses, examples could include three voices of different and similar timbres, and finally four voices of different and similar timbres. To challenge students even further, some five or more voice dictations could be given to gauge the students' abilities to discern the different musical

lines in larger ensembles. Challenging students with the dictation of five or more voices will prepare them for real world applications of discerning parts.

The ability to identify the various lines of instrumental ensemble pieces is useful in the careers of all musicians, and many musicians graduate with their degree program without having mastered the ability to discern multiple parts simultaneously. My hope is that this study will encourage further research concerning the ability to identify multiple voices and its effect on the lives and careers of musicians.

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APPENDICES

APPENDIX A: Excerpt Information and Survey

Adolphe Deslandres - *Trois Pieces en Quintette*

Score used through public domain

Audio purchased through iTunes, performed by the Borealis Wind Quintet

Wolfgang Amadeus Mozart - Symphony No. 23 in D Major, K. 181 was

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Audio purchased through iTunes, performed by the Berlin Philharmonic Orchestra

Igor Stravinsky - Septet

Score used by permission of Boosey and Hawkes

Audio purchased through iTunes, performed by the Columbia Chamber Ensemble

Robert Beaser - Brass Quintet

Score used by permission of European American Music Distributors Company, agent for
Schott Helicon Music Corporation

Audio purchased through iTunes, performed by the American Brass Quintet

Leonard Bernstein - *Symphonic Dances from West Side Story*

Score used by permission of The Leonard Bernstein Office

Audio purchased through iTunes, performed by the Los Angeles Philharmonic Orchestra

Ron Nelson - *Rocky Point Holiday*

Score used by permission of Boosey and Hawkes

Audio purchased through iTunes, performed by the Dallas Wind Symphony

Vincent Persichetti - Divertimento for Band, Op. 42

Score used by permission of Carl Fischer Music/Theodore Presser Company

Audio purchased through iTunes, performed by the Cincinnati Wind Symphony

Pyotr Ilyich Tchaikovsky - Serenade for Strings in C Major, Op. 48

Score used through public domain

Audio purchased through iTunes, performed by the Vienna Chamber Orchestra

Percy Aldridge Grainger - *Shepherd's Hey*

Score used by permission of Carl Fischer Music/Theodore Presser Company

Audio purchased through iTunes, performed by the North Texas University Wind
Ensemble

Edward Elgar - String Quartet in E Minor, Op. 83

Score used by permission of Ludwig Masters Publishing Company

Audio purchased through iTunes, performed by the Maggini Quartet

Instructions

Informed Consent Statement

A Study of the Efficacy of Aurally Discerning Musical Parts in the Context of an Instrumental Ensemble

INTRODUCTION

The purpose of this research study is to understand what aspects of music hinder the ability to aurally discern various musical parts. The survey will also collect information regarding the ability to be successful at this task in correlation to demographic information such as gender, ethnicity, major, and musical experience.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

In order to participate in this survey, you must be majoring in a discipline within the field of music.

The survey consists of ten short audio examples that represent a variety of compositional styles, genres, and instrumentations. After listening to each example, you will be prompted to select the musical staff that represents the part you are asked to discern. The survey will collect data based on the answers chosen.

The survey is given via the computer and will take approximately 40 minutes to complete.

RISKS

Participating in this survey poses no foreseeable risks beyond those encountered in everyday life.

BENEFITS

The results of this survey will assist in understanding the factors that may cause a deficit in the ability being tested.

CONFIDENTIALITY

The information in the survey records will be anonymous. Basic demographic questions will be asked at the end of the survey, but you will never be asked for your name. Data will be stored securely and will be made available only to persons conducting the survey. No reference will be made in oral or written reports that could link participants to the survey. All data reported either orally or in writing will be anonymous.

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime without penalty and without loss of benefits to which you are otherwise entitled.

CONTACT

Principal Investigator:
Brady McNeil
bmneil3@vols.utk.edu
334-726-5807

Faculty Advisor:
Barbara Murphy
bmurphy@vols.utk.edu
865-974-7549

If you have any questions about your rights as a research participant, you may contact the UT Office of Research IRB Compliance Officer.

Institutional Review Board:
utkirb@utk.edu
865-974-7697

CONSENT

Do you wish to participate in this study? By clicking yes, you are acknowledging full consent for participation. If you choose not to participate, you may select 'No' and you will be directed to the end of the survey. Thank you for your consideration.

- ☐ Yes, I wish to carry on with the study.
- ☐ No, I do not wish to carry on with the study.

Instructions:

You will be given ten different audio examples that represent a variety of genres, time periods, instrumentations, and textures. You will be prompted to listen for a particular part within the audio example. You will be given four staves of musical notation that represent different musical parts of the piece. You must choose the staff that represents the part you were prompted to listen for.

You will be given two minutes for each excerpt and you may listen to the excerpt as many times as you wish within those two minutes. Once two minutes have expired, the survey will automatically move forward to the next block of questions. Be sure to select your answer within those two minutes.

After choosing your answer, you will be asked to rate various characteristics of the music and how those characteristics might have made discerning the particular part easier or more difficult. Please take your time and answer these questions as honestly and accurately as possible. There is no time limit for this block of questions. You will also be given the opportunity to provide any other specific characteristics that might have led you to your answer. Be as specific as possible.

Once you have completed all twelve examples, you will be prompted with demographic questions. This survey is **completely anonymous**. Please answer all questions in complete honesty. If you have any questions at any time, raise your hand and the primary researcher will assist you.

Use the following practice audio example to adjust the volume of your headphones to a comfortable level. Once your volume is adjusted, you may begin the survey.

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Deslandres woodwind quintet

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0106

Adolphe Édouard Maries Deslandres - Trois Pièces en Quintette: I. Andante

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Which of the following staves shows the horn part that was played in this woodwind quintet

Four musical staves are shown, each with a radio button to its left. The staves are in 3/4 time and show a melodic line with dynamics *mf*, *cresc*, and *f*.

Staff 1: *mf* *cresc* *f*

Staff 2: *mf* *f*

Staff 3: *cresc* *f*

Staff 4: *mf* *cresc* *f*

Indicate below whether each of the following characteristics made it easier or more difficult to identify the horn part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the horn part? (Describe below)

Mozart symphony

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0106

Wolfgang Amadeus Mozart - Symphony No. 23 in D, K. 181: I. Allegro spiritoso

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Which of the following staves shows the cello/double bass/cello part that was played in this



Indicate below whether each of the following characteristics made it easier or more difficult to identify the cello/double bass part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to pick out the cello/double bass part? (Describe below)

Stravinsky septet

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0106

Igor Stravinsky - Septet, First movement

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Which of the following staves shows the bassoon part that was played in this septet?



Indicate below whether each of the following characteristics made it easier or more difficult to identify the bassoon part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the bassoon part? (Describe below)

Beaser brass quintet

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0106

Robert Beaser - Brass Quintet: Little Requiem with Fanfares

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Which of the following staves shows the tenor trombone part that was played in this brass

Four musical staves are shown, each with a radio button to its left. The staves contain musical notation for a tenor trombone part. The first staff has a radio button and the notation. The second staff has a radio button and the notation. The third staff has a radio button and the notation. The fourth staff has a radio button and the notation. Below the staves is a horizontal progress bar.

Indicate below whether each of the following characteristics made it easier or more difficult to identify the tenor trombone part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the tenor trombone part? (Describe below)

Bernstein, West Side Story

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0106

Leonard Bernstein - Symphonic Dances from *West Side Story*

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Which of the following staves shows the English horn part that was played in this piece?

Four musical staves are shown, each with a radio button to its left. All staves are in 3/4 time and marked *pp* (pianissimo). The key signature has three sharps (F#, C#, G#).

- Staff 1: A continuous melodic line with eighth and sixteenth notes.
- Staff 2: A melodic line with some rests.
- Staff 3: A melodic line with some rests.
- Staff 4: A continuous melodic line with eighth and sixteenth notes.

Indicate below whether each of the following characteristics made it easier or more difficult to identify the English horn part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the English horn part? (Describe below)

Nelson, Rocky Point Holiday

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01 06

Ron Nelson - Rocky Point Holiday

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<https://utk.co1.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview>

Which of the following staves show the baritone part that was played in this piece?

Four musical staves are shown, each with a radio button to its left. The staves are in bass clef, 2/4 time, and key of D major (two sharps). The first staff has a *pp* dynamic marking. The second staff has a *pp* dynamic marking. The third staff has a *pp* dynamic marking. The fourth staff has a *pp* dynamic marking.

Indicate below whether each of the following characteristics made it easier or more difficult to identify the baritone part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the baritone part? (Describe below)

Persichetti divertimento

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0106

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- Four staves of musical notation for the 'Piano' section of 'The Swan' by Maurice Ravel. The notation is in bass clef, 2/4 time, and D major. The first staff is marked *mf* and the second *mp*. The third and fourth staves are also marked *mf* and *mp* respectively. The music features a mix of eighth and sixteenth notes, often beamed together, and rests.

[illegible]

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the euphonium part? (Describe below)

Tchaikovsky serenade

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0106

Pyotr Ilyich Tchaikovsky - Serenade for Strings in C Major, Op. 48: I. Pezzo in Forma di Sonatina

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Which of the following staves shows the cello part that was played in this piece?

☐ 

☐ 

☐ 

☐ 

Indicate below whether each of the following characteristics made it easier or more difficult to identify the cello part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐

Qualtrics Survey Software

Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the cello part? (Describe below)

Grainger, Shepherd's Hey

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0106

Percy Aldridge Grainger - Shepherd's Hey

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Which of the following staves shows the mallet percussion part that was played in this piece?

- ☐

Indicate below whether each of the following characteristics made it easier or more difficult to identify the mallet percussion part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the mallet percussion part? (Describe below)

Elgar string quartet

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0106

Edward Elgar - Quartet in E Minor for String Quartet, Op. 83, I.

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Which of the following staves shows the viola part that was played in this string quartet?

☐

☐

☐

☐

Indicate below whether each of the following characteristics made it easier or more difficult to identify the viola part.

	Very Easy	Easy	N/A	Difficult	Very Difficult
Timbre	☐	☐	☐	☐	☐
Voice crossing	☐	☐	☐	☐	☐
Range	☐	☐	☐	☐	☐
Tempo	☐	☐	☐	☐	☐
Texture	☐	☐	☐	☐	☐
Dynamic	☐	☐	☐	☐	☐

Did any other musical characteristics restrict or contribute to your ability to identify the viola part? (Describe below)

Demographics

With which gender do you identify?

- ☐ Male
☐ Female
☐ Transgender
☐ Prefer not to respond

With which ethnicity do you identify?

- ☐ Arab
☐ Asian / Pacific Islander
☐ Black or African American
☐ Caucasian / White
☐ Hispanic
☐ Latino
☒ Multiracial
☐ Native American / American Indian
☐ Prefer not to respond
☐ Other (specify)

What is your age?

What year in school are you?

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Graduate student

What is your major?

If you are a non-music major please type in your major below.

What is your minor?

If you have a minor different than those listed above please type it below.

Which category does your instrument fall within?

Please select your primary instrument.

How long have you been playing / studying your primary instrument?

Are you proficient in any other instruments? If so, list below.

When listening to music, how often do you sing along?

Never
☐

Seldom
☐

Often
☐

Always
☐

With which part do you most commonly sing along?

☐ Melody

☐ Background singers

☐ Bass line

☐ Instrumental accompaniment

☐ The instrument I play

☐ Improvise harmony

☐ Other (specify)

Have you ever conducted a music ensemble of any kind?

☐ Yes

☐ No

Which type of ensembles have you conducted? (Select all that apply)

☐ Chamber ensemble

☐ Wind ensemble

☐ Orchestra

☐ Choral ensemble

☐ Church ensemble

☐ Other (specify)

Thank you for your participation in this study!

If you have questions about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, Brady McNeil, at (334) 726-5807 or at bmcneil3@vols.utk.edu. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-3466.

APPENDIX B: Recruitment Email

Music Students,

My name is Brady McNeil and I am a graduate student studying music theory here at the University of Tennessee. I would like to request your participation in a research study. The study concerns the efficacy of discerning inner musical lines within the context of an instrumental ensemble. For my research, I have created an online test that includes ten instrumental music examples ranging a variety of eras, genres, textures, and timbres, and you will be asked to identify a specific part that is being played. For example, you may be asked to identify the trombone part in a brass quintet excerpt or the cello part in a thin-textured excerpt of a symphony. Following each musical example you will be given the opportunity to address any characteristics that led you to or delayed you from your answer. The purpose of this study is to determine whether or not students can identify the various musical lines in instrumental works, and if not, to understand what makes this very task difficult in hopes of discussing possible implementations to aural skills curricula that may address this deficiency.

This study is open to all undergraduate and graduate music students. Although the test only concentrates on instrumental music, vocal students are also invited and encouraged to participate. In order to draw significant conclusions I would love to have at least fifty students for the study, but I will take as many as I can get. The survey will be administered under my supervision in the ear-training lab (HMC G11). If you would like to volunteer to participate in this study, please email me at bmneil3@vols.utk.edu and we will set up a time that works best for your schedule. The survey will take approximately 45 minutes to complete. Your participation is greatly appreciated.

Brady McNeil
Graduate Student, Music Theory
University of Tennessee
bmneil3@vols.utk.edu | 334-726-5807

VITA

Brady McNeil was born and raised in Slocomb, a small town in south Alabama. He is the younger son of Terry and Tami McNeil. Brady attended school at Slocomb Elementary, Middle, and High School. After graduating as Valedictorian of his high school class, Brady studied music education at Auburn University in Auburn, Alabama. During his time at Auburn, Brady played trumpet, and participated in domestic and international tours with the Auburn University Symphonic Band as well as the Auburn University Chamber Choir. He graduated from Auburn *summa cum laude* with his Bachelors of Music Education degree in May 2014. Brady then attended the University of Tennessee, Knoxville, where he was a graduate teaching assistantship in music theory. As a GTA, he served as an instructor for ear-training courses as well as the Fundamentals of Music Theory course. During his free time at the University of Tennessee, Brady enjoyed acting in musicals at local community theatres as well as the Clarence Brown Theatre at the UT. Brady graduated *summa cum laude* with a Masters of Music degree in Music Theory in May 2016.