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Effects of presentation mode on community college students' perception of performance quality and self-reported level of musical engagement.

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Dissertation

EFFECTS OF PRESENTATION MODE ON COMMUNITY COLLEGE
STUDENTS' PERCEPTION OF PERFORMANCE QUALITY AND
SELF-REPORTED LEVEL OF MUSICAL ENGAGEMENT

by

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DEDICATION

This dissertation is dedicated to my mother Fern M. Reddan and my father John A. Reddan whose support and encouragement made my musical journey a reality. Additionally, I dedicate this to Mrs. Marian Geason, Mrs. Beverly Roach, and Mr. Leroy Pressley, my elementary, middle, and high school music teachers, who saw the music within me.
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ABSTRACT

The purpose of this study was to examine the effect of presentation mode on community college students’ ratings of a choral performance and self-perceived level of engagement with the music controlling for age, gender, and previous musical training.

The following research questions were explored: (a) what effect, if any, does presentation mode have on participants’ ratings of the quality of a choral performance; (b) what effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of the quality of a choral performance; (c) what effect, if any, does presentation mode have on participants’ ratings of their engagement with the music during a choral performance; (d) what effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of their engagement with the music during a choral performance; (e) why do participants rate the quality of a choral performance of one presentation mode higher than others, if at all; and (f) why do different presentation modes make participants feel more or less engaged with the music, if at all.

Community college students (N = 71) enrolled in four music appreciation courses
at two community colleges rated their perceptions of the performance quality and their level of engagement with the music on four-point Likert-type scale for three presentation modes. Participants provided written responses explaining their ratings. Quality and engagement ratings were analyzed using a three-way repeated measures MANCOVA controlling for age, gender, and years of training. Results indicated that presentation mode was a significant predictor of participants’ ratings of quality ($p < .001$) and level of engagement ($p < .001$). There was a significant within-subjects effect ($p < .05$) for age and quality, and between-subjects effect ($p < .05$) for years of training and engagement.

Qualitative data were analyzed, coded, and themes were identified. Themes included focus of attention, environmental factors, technology, and preference affected perceptions of quality. Technology and perception of performance quality affected level of engagement.

It was concluded that the presentation mode used to present a listening experience to community college students had a significant effect on students’ perceptions of performance quality and level of engagement with music during a listening experience. Moreover, students’ perceptions of quality and engagement were most often related to a variety of factors that influenced their focus of attention during the listening experience.
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CHAPTER 1

Introduction

Music appreciation courses have become a common offering at many community colleges and universities in the United States (Committee on Music in Junior Colleges, 1970). In the most recent study of community college curricular trends in 164 community colleges of various sizes, Brawer (1999) found that 90 percent of community colleges offer courses in music appreciation and listening (p. 25). These courses often include both music and non-music majors with very different motivations for enrolling in the course. There are multiple teaching challenges for instructors of music appreciation courses. One of these challenges is finding ways to enhance and provide meaningful listening experiences to students. A music listening experience is generally any experience that a person has listening to music. For music educators and students, the listening experiences are often planned, purposeful experiences that take place in the classroom that many of us hope will inform students’ music listening experiences beyond the classroom. The experience may include visual, auditory, and kinesthetic elements.

The music listening experience and its importance have been noted in philosophical discussions about music education (Elliott, 1995; Jorgensen, 1993, 2002; Reimer, 2003), the use of music as a form of communication (Byrne, 2005), the development and use of technology to listen to music both in and out of the classroom (Levitin, 2008; Killian, 2001; Rudolph & Frankel, 2009), and music psychology (Seashore, 1967).

Music educators can present music listening examples that include auditory, visual, or auditory and visual stimuli. Stimuli are defined as objects or events that are
"apprehended by the senses" (stimuli, n.d.). This means that a person perceives the objects or events through the emotions or senses when they are happening. This also means that a person’s perceptions of the quality of what they have seen or heard could be perceived differently because a person’s perceptions of an event are subjective and vary by listener (Finnäs, 2001). Quality is how a person can describe to what level what has been heard or seen is considered to meet a higher or lower standard of excellence (Collins English Dictionary, quality, n.d.). In addition to the stimulus having a possible effect on perceptions of a listening event, it is possible that the way the stimulus is presented to students could affect their perceptions of the event.

There are three general methods that music educators use to present a music listening example to students: listen to a recorded musical example with no visual component (audio-only recording); watch and listen to a recorded musical performance with both visual and aural components (audio-visual recording); or, watch and listen to a live musical performance with both visual and aural components (live presentation). Each of these methods of presenting music listening experiences to students is a presentation mode. According to Collins English Dictionary, a presentation is “the manner of presenting, especially the organization of visual details to create an overall impression” or “a performance or representation” (presentation, n.d.). In listening examples where a visual stimulus is part of the experience, the stimulus could be a part of a video game, music video, or simply just pictures. Another possible method of presenting music listening examples to students is to listen to a live musical performance that cannot be seen. Understanding how the presentation mode affects a student’s perception of the
performance may help music educators design lessons and assessments based on students’ reactions to different types of stimuli during the music listening experience.

**Background and Problem**

People are able to listen to music in a variety of ways, providing music educators and students with many technological options for use in the music classroom (Fredstrom, 2011; Kotora, 2001; Rose & Wagner, 1995). “The rapid technological changes that have taken place...have led to equally rapid changes in the diversity and availability of music, and in ways in which people engage with and ‘consume’ it” (Hargreaves, MacDonald, & Miell, 2005, p. 1). It is now possible, with existing technology, for a student to listen to music almost anywhere, at any time, with an entire music library at their fingertips (Hargreaves et al., 2005). For music educators, how students engage in music listening can be an important consideration when teaching listening skills. In the *Collins English Dictionary* to be engaged is defined as “to occupy the attention or efforts of (a person or persons)” (engaged, n.d.). Students’ perceived level of engagement—how effectively the music is perceived to occupy the attention of the student—when listening to music in and outside of the classroom is of interest. In this case, the term engagement is used to understand students’ perceptions of their own focus of attention during the music listening experience.

Educators have debated the role of student as listener in activities both in music appreciation and music ensemble classes (Elliott, 1995, 2005; Reimer, 2003). Listening skills and student responses to listening events in music classes and performance have been a conundrum in music education and for music educators throughout the 20th and
21st centuries (Dunn, 2004, 2008; Kerchner, 2000). Many music educators may teach students to listen critically including listening for dynamic range, tempo, intonation, and form. Other music educators may teach students to listen analytically to attribute meaning and feeling to what they have heard. In an ensemble, music educators and students can examine their own performances through critically listening to recordings of rehearsals and concerts, or evaluate the performances of other ensembles in similar conditions (Killian & Basinger, 2007; Napoles, 2009; Oregon School Athletics Association, 2011). Music educators can promote listening and artistry “by increasing…connection with the art using varied media” (Fredstrom, 2011, p. 25); however, to increase connection with the art, it will be important for music educators to understand if the presentation mode used to transmit music has an effect on students when engaged in listening activities.

There are many different types of media that can be used to present music in three presentation modes: live, audio-only, and audio-visually. Live presentations include school concerts or performances, or ensemble contests where the student experiences the musical performance as it takes place (Burnsed, Hinkle, & King, 1985). Audio-only presentations take place in the classroom for students to assess dimensions of their own and others’ music performance via a cassette, record, compact disc, iPod, or other device (Killian, 1990, 2001; Webb, 2007, 2010). Audio-visual presentations, including the use of videotapes, DVDs, or YouTube videos of musical performances, often occur in music classrooms so students hear and see the performance simultaneously (Ebie, 2004; Killian 1990, 2001). Hamlen and Shuell (2006) noted that “as music educators strive to help students develop an appreciation of classical music, it would be useful for them to
understand and exploit student preferences in both learning and in music,” especially when using multimedia in the classroom (p. 22). It is important to note that, of the three types of presentation modes described, two—audio-only and audio-visual—include the use of recorded musical performances in addition to live performances.

The use of recorded music can mean a variety of different things to music educators and students; therefore, the definition of ‘recording’ must be clarified. Recordings can include aural-only experiences using cassette tapes, iPods, or compact discs, or audio-visual experiences including VCR tapes, DVDs, or Internet movies. The presentation mode of the listening example could affect students’ interpretations of a musical work and the listening experience. Recordings are not typically representative of a real world classical concert experience. The use of recordings only as listening experiences for students may result in devaluing the recorded music (Finnäs, 2001). The sole use of audio-only recorded music implies that music is an aural-only experience, further limiting students’ appreciation of a musical work.

Because students are individuals and unique, it is important to investigate how individual factors affect their perception of quality of a performance and perceived level of engagement for each presentation mode. Students in community colleges typically represent a wide age range from those that have just graduated from high school to those who are older and returning to school for retraining (American Association of Community Colleges, 2012b). Each student’s previous musical training may be extremely different from others. These differences could include the length and type of musical training that they have experienced and the availability of music education prior
to enrolling in a collegiate music appreciation course. The amount of previous musical training may be different. A student’s prior musical training prior to engaging in structured listening tasks in a music classroom might have an effect on their perception of, and perceived engagement with a presentation of a musical performance.

It will also be important to understand if gender has any effect on student perceptions about a musical performance. In addition to gender being a part of everyday social life, researchers (Egermann & McAdams, 2013) have suggested that there may be some differences in the way males and females perceive music during a listening experience. Understanding how age, gender, and previous musical training affects students’ perceptions about a musical performance will provide further insight on how music educators can meet the needs of all of their students when teaching music listening skills in the music appreciation classroom.

**Why Music Listening Matters: Goals of Music Education**

The teaching of listening skills has historically been an important aim of music education, and some researchers have even attempted to develop models for music listening and musical preference (LeBlanc, 1980). Jorgensen (2002) stated that “music education is naturally concerned with enriching and broadening listeners’ understandings whether of the functions of music or its formal elements” (p. 33). Furthermore, Jorgensen (2002) noted that an end of music education is “to transform, not just transmit musical practice, to subvert more than only sustain extant musical traditions in an effort to promote imaginative thought and practice and liberate the spirit” (p. 38). To transform music education also means to understand what is happening during the educational
process. If listening to music is a skill that music educators value, then it is important to understand what happens when students listen to music and how the presentation mode affects students’ engagement with the music during the listening experience. In music appreciation classes, students are often in an audience role listening to and experiencing music. Swanwick (1988, citing Reese, 1980) noted that when students are in this role, they should first experience the work without analysis or talk. Moreover, the conversations that take place after the listening experience are just as important and important to teaching and learning during music listening. “What students have to say or ‘tell’ about this experience is important....Sensitive musical criticism has the power to enhance musical response” (Swanwick, 1988, p. 132-133).

Additionally, it is important to understand if there are any other factors unique to the students themselves—such as age, gender, and their prior musical training—that affect their perception of a musical performance. Jorgensen (1993) explained the importance of the listener in the music experience as an “interrelationship between performer-composer-listener in a dynamic interchange, in which all are intimately and vitally involved in an egalitarian and inclusive enterprise as participants and in which roles become fused or at least fuzzy” (p. 36). Because of the relationship between performer, composer, and listener, the teaching of listening skills is an important end to music education.

How and why music educators employ different types of presentation modes to teach music listening needs further exploration if music educators are to effectively increase their attention to music listening in music education. Additionally, understanding
how and why students feel different levels of engagement with a musical work will be important for music educators to meet the needs of all students. If students build memories based on their associations to music itself, then the use of audio-only presentations to teach music listening in the classroom makes sense. In contrast, if music educators are also engaged in teaching students to attend and appreciate live performances, then the use of multiple-sensory stimulation or cross-modal presentation of music warrants additional investigation. Therefore, the presentation mode used in the listening experience could have an effect on students’ perceived engagement with and perception of the musical event because the presentation mode used may affect what information about a musical performance is communicated to the listener.

**Music as Communication Matters in Music Listening**

Music is a form of communication that includes talking about, performing, and listening to music (Byrne, 2005). Talking about music and communicating musically are not the same, especially in a music classroom (Byrne, 2005, p. 301). For example, talking about music is one way to communicate musically. Students can discuss what they have heard or seen in a performance, structures or factors affecting the music, or how to perform. Performing is another type of musical communication. Performers communicate by showing the listener, rather than telling them, what they know about music and musical performance (Swanwick, 1988).

It is important to define what is meant by *musical content* when considering musical communication. Musical content may be defined by what is communicated to the listener during a musical performance. If music is presented live or communicated
through recording or broadcast, it will cause the listener to have a response or reaction to what has been communicated (Hargreaves et al., 2005). The performer communicates physical, cognitive, social, or emotional information to the listener—the student in the case of music education—who then reacts to it. The meaning that the student creates based on what they have heard is unique to the individual student and may be influenced by individual attributes including the students’ age, gender, and musical training. The arts of performing and listening to music require a complex discourse, one that can be complicated by changing technology. The method used to communicate a musical idea in a music classroom, dependent on the presentation mode used by the music educator for any given listening example, may have an effect on students’ perception of the quality of and feeling of engagement with a listening experience.

The listener has the capacity to shape the content and meaning of the message being transmitted by the performer (Hargreaves et al., 2005, p. 4) both in response to what has been heard and in continued consumption of musical works of various genres and composers. The experiences that students have with music outside of the classroom, especially as consumers, can be very different than those that happen in the music classroom. Additionally, a student’s perception of the quality of a musical performance could be affected by the length of their musical training (and this musical knowledge) and perceived level of engagement during the music listening experience. Therefore, the music listening context, especially how a musical event is transmitted to students (mode of communication) becomes increasingly important (Hargreaves et al., 2005).
Technology and Presentation Mode Matter for Teaching Music Listening

The invention of recording technology is one of the most important developments in the history of music making (Hargreaves et al., 2005; Levitin, 2008). The art of sound recording removes the visual stimuli associated with live music performance which, prior to the 20th century, was the primary way people experienced music. It is easy to understand why de la Motte-Haber (2002) suggested that “the traditional conditions of music production and reception are no longer valid” (p. 204). Even if a performance can be recorded exactly as it happened, and potentially played an infinite number of times, whether or not the listener was actually at the event can have an effect on the way that the listener experiences music (Levitin, 2008). Additionally, the listener’s engagement with, and perception of the overall quality of the performance could be affected by the presentation mode (i.e. with or without a technological influence). Essentially, recordings (audio or audio-visual) have become distinct aesthetic objects (Levitin, 2008, p. 283). Recordings may affect students’ music education in terms of listening to and appreciating music both inside and outside of the music classroom. Therefore, it is understandable that researchers suggest further study of the effects of technology, various viewing/listening formats, and recorded and live music performances on students’ ability to listen to and appreciate music (Enders, 2002; Finnäs, 1987; Killian, 2001; Rudolph & Frankel, 2009).

Using different presentation modes in the music classroom could affect a student’s listening experience. Heller and Campbell (1997) noted that recordings modify live musical performance because they must be mediated between performer and listener. “Music from recorded or broadcast sources now provides the primary listening
experience for many people” (Heller & Campbell, 1997, p. 32). Historically, live musical performance was thought to be superior to technologically produced music because of its acoustic quality (Finnäs, 2001, p. 56). Today the use of electronic instruments in both live and recorded music, in combination with other advances in technology, can make a person feel as if they were experiencing a musical performance in a live concert setting. Although a live musical performance may not be of a higher or lower quality than a performance using a technological medium, the “directness” of the live presentation “easily generates a momentary feeling of contact between performers and listeners” that may be more separate in aural-only or technologically reproduced audio-visual recordings (Finnäs, 2001, 57). Because of the connection that can be created between performer and listener during a live musical performance, the listener could be more emotionally involved (i.e. engagement), resulting in greater appreciation for the music that was both seen and heard. If a connection is not created between performer and listener, it is possible appreciation could decrease. If appreciation decreases, it is possible that the presentation mode may have had an effect on students’ perception of the quality of the performance, engagement with the music, thus affecting their appreciation of the music listening experience.

In addition to the connection between listener and performer that is created in a live performance, the visual stimulus in live and audio-visual musical performances can play a positive role in the listener’s experience (Adams, 1994; Dekaney, 2012; Finnäs, 2001). Finnäs (2001) noted the importance of how a musician’s coordinated movements and postures may support musical factors such as tempo and rhythm (p. 57). Researchers
Finnäs (2001; Geringer, Cassidy, & Byo, 1997; Guerrini & Alexander, 2012; Howard, 2012) have noted that nonmusical factors can affect the listener’s experience including facial expression, body language, and dress. Too much visual stimuli may be distracting to a listener (Finnäs, 2001, 59). Howard (2012) noted that when watching singers perform, their attire, stage deportment and facial expression can affect a person’s perception of the performance. When singers perform together in a large choral ensemble, the stage deportment, interaction amongst the singers, facial expression, and attire could affect their perception of the listening experience. A visual experience as part of music listening could affect a student’s affective response, either enhancing or distracting from the vividness of the experience and focus of attention during the listening experience. Moreover, the presence or absence of visual stimuli during the music listening experience may be interpreted by a student as intrinsic to the listening experience itself affecting the students perceived level of engagement when listening to music. Listening to and watching a large ensemble performance could affect students’ perceptions of what they have heard and requires further inquiry. Mitigating factors such as the student’s age, gender, and previous musical training including their experiences with music with different presentation modes and technology might affect their ability to make meaning of the musical experience.

A concern for music educators deciding to use live, audio-only, or audio-visual presented music for listening experiences is whether the experience confounded by different factors (e.g. the listening situation, environment, or visual stimulus) (Finnäs, 2001, 58). A common teaching practice is for students to first listen to music presented to
them as, for example, a compact disc recording (an audio-only listening experience) and then talk about the music (nonmusical communication) (Gordon, 2012). The music is presented as audio-only, but other factors could play an important role in the student's listening experience. The student's mood, previous listening experiences and familiarity with the presentation mode, age, gender, the classroom environment, the sound quality of the recording, and the student-teacher interactions during the experience affect the student’s perceptions of what he or she “heard.” Understanding if and how aural, visual, and cross-modal musical presentations affect the reactions of listeners may have important implications for how music educators teach music listening in ensemble and music appreciation classrooms.

Whether experienced live or via recording, the experience of music can include the incorporation of both visual and auditory experiences. When students-as-listeners hear and see at the same time, they are able to view the expressive movements of the performer taking part in performer-listener communication (Davidson, 1993, 1995). The visual part of the performance can provide more information for both music and non-music students than the auditory stimulus alone, especially if the visual aspect of the experience is perceived as intrinsic to the music itself. Gabrielsson (1999) postulated that the presence of a visual component during listening experiences highlights “the need for investigating the role that visual information may play in music perception” (p. 523). Additionally, for music educators, understanding the role visual information can play in music perception, especially when paired with auditory information, could have important implications for music praxis both in and out of the classroom. For any music
student, previous music training using different types of music technology that enable them to either hear, see, or hear and see a musical performance may have an effect on their perception of the musical event. A student’s age and familiarity with different presentation modes based on the technology they use to listen to music could also affect student perceptions of a listening experience. Therefore, understanding how different presentation modes affect students’ perceived engagement with music in using different presentation modes requires further investigation.

**Music Listening: Psychology and Perception**

Research in music psychology often informs the practice of music education. Carl Seashore (1967), a music psychologist, posited that there are three parts of “music” related to the psychology of music: the musician, the music, and the listener. Seashore (1967) explained that “everything that the singer or player conveys to the listener is conveyed through sound waves or in terms of these” (p. 13). If this is true, then music is essentially a singular stimulus unaffected by other senses. Moreover, if only sound is a musical stimulus, then how the sound is transmitted to the listener would only include auditory stimuli. Researchers (Dunn, 2008; Howard, 2012; Killian, 2001) have noted in previous studies that what a student hears is not the only thing that students consider as part of a musical performance. If only the physical sound is the musical medium as Seashore (1967) stated, consideration should be given to how the medium is transmitted to the listener. Based on Seashore’s (1967) argument, only what is heard is considered music, and the visual component of a performance would not do anything to enhance or convey information to the listener. The presentation mode, which can include one or
more parts of the experience (aural and visual) that are perceived as part of the music, and its pedagogical effectiveness for teaching musical listening in the music classroom warrants further investigation.

Levitin (2008) stated that “as hearing became refined, and responsive to environmental events, selection pressures made all vertebrate brains sensitive to differences in pitch, spatial location, loudness, timbre, and rhythm, the fundamental ways in which objects can be differentiated from one another through sound” (p. 245). If the information that a student perceives from hearing music is responsive to environmental events, then other senses such as vision may influence the student’s perception of the quality of, and perceived engagement with the listening event. Furthermore, the combination of several stimuli within the music listening experience can affect metacognition, the ability to reflect upon our own thoughts (Levitin, 2008, p. 252). If one of the aims of music psychology is to understand how different “mechanisms that intervene between music reaching a person’s ears and an emotion being experienced or detected by that person as a result of hearing that music,” (Sloboda & Juslin, 2010, p. 73) then there are important psychological processes that can be studied in a music education setting. The presentation mode is an intervening mechanism that can affect a student’s response to what is being heard. Moreover, the music reaching the student’s ears could be affected by the visual stimulus paired with the auditory stimulus. “Any theory of musical expressiveness, which is an important part of music listening, must acknowledge and respect the phenomenological vivacity and particularity with which music presents its expressive act” (Davies, 2010, p. 26). Therefore, from both a theoretical perspective in
music education and psychology, it is important to understand how the presentation mode affects a student's response to a musical event.

Researchers have attempted to understand music perception related to music listening using either singular or cross-modal stimulation in studies using neuroimaging (Gonzalo & Büchel, 2003), affective judgments (Andrade, 2005; Burnsed et al., 1985; Clore & Huntsinger, 2007; Dekaney, 2012), expression (Rodriguez, 1998) practice strategies (Linklater, 1997), musical memory (Demorest, Morrison, Jungbluth, & Beken, 2008), musical ability (Ebie, 2004) and ratings of musical stimuli (Bergee, 1995, 2007). Because listening is an experience unique to the individual, accounting for differences in the perception of musical events can be difficult. Continued exploration of how different intervening mechanisms affect students' perception of what they listen to in the music education classroom can help to inform the development and refinement of theories of music listening and perception. Moreover, continued exploration of how presentation modes affect students' perceptions of a listening event would help music educators teach listening skills effectively.

Listeners (i.e. students) have a variety of different factors that can affect their perceptions including different ages, experiences, and training. Moreover, many researchers based their research on the control of microstructures of music and behavior in order to understand how they contribute to larger music phenomena (Sloboda, 2005, p. 100). When learning listening skills, students learn about the microstructures of music, engaging students in listening to entire musical works, and helping them to understand and appreciate the real world listening experience of the classical concert. The real world
is both a physical and social place that affects students’ understanding of music (Sloboda, 2005, p. 167); however, the presentation mode can confound students’ understanding and experiences with classical music both in and out of the music classroom. Therefore, understanding how presentation modes in addition to individual student factors including age, gender, and previous musical training affect students’ perception of quality and perceived engagement with music using different presentation mode requires further investigation.

**Music Listening Experiences of Community College Students Matter**

Technology has become an important part of music education because of its practical use by both teachers and students, in and outside of the music classroom (Biamonte, 2011; Burz & Marshall, 1999; Conway & Hodgman, 2009; Enders, 2002; Reese et al., 2001). Since the Tanglewood Symposium in 1967, music educators have been concerned with the use of technology and interactive media in the music classroom (Choate, 1968; Cohen & Brawer, 2003; Conway & Hodgman, 2009; English, 1994).

Community colleges have played a critical role in the music education of a diverse population of students (American Association of Community Colleges, 2012a; Cohen & Brawer, 2003; Mullin, 2012). Music performance ensembles and music appreciation courses have been common components of a community college music or general education for over 40 years (Brawer, 1999; Committee on Music in Junior Colleges, 1970). In music appreciation and performance ensembles course, students can engage in critical listening to examine performance quality during a lecture, rehearsal, concert, or contest situation. Moreover, critical listening may have an effect on students’
music education and music consumption outside of the classroom.

Although most, if not all, Americans have heard music through the use of some form of technology, Garcia (2007) noted that the current generation of college students—the millennial students (students born after 1980)—have many more technological options for listening to and watching music performances than students from earlier generations did at their same age. The technology available to the millennial generation is far advanced from the phonograph, record player, or cassette player. In Garcia’s (2007) study of millennial students’ perceptions of the modern classroom, technology was a concern for both students and faculty. Researchers have suggested that students have preferences for a variety of different presentation modes and performance mediums when listening to and viewing musical performances (Ebie, 2004; Frankel, 2010; Howard, 2012; Killian, 1990, 2001; Lychner, 2008). This is an important consideration for music educators, especially in two-year community colleges. If students have predetermined preferences for different presentation modes, especially if they use particular presentation modes to experience music outside of the classroom, then their perceptions of what they see and hear could be affected based on their preferences (Finnäs, 1987, 2001).

Many community college music and non-music students do not pursue a degree beyond the associate degree (American Association of Community Colleges, 2012a). Community college students tend to represent a wider age range of students, with more diverse backgrounds, than students attending four-year institutions. For example, many millennial students may have never listened to music on a record player; however, they are in classes with many older students whose first musical experiences were with record
players, radios, and eight-track tapes, which are all aural-only presentation modes. Millennial students have had the advantage of technological advances such as the iPod, the Internet, social media, and YouTube. Therefore, a student’s age could have an effect on their perception of the quality of a musical performance depending on what types of presentation modes they have experience with or prefer. Considering community college students’ diverse backgrounds and wide age range, it is also possible gender and prior musical training may affect students’ perception of the quality of and engagement with a music performance depending on the presentation mode. Understanding how technology affects the diverse population of students that is typical of the 21st century community college can help music educators understand the role technology plays in students’ music education in and out of the classroom.

**Music Listening: Ecological Perception and Listening Response Theories**

In *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning*, Clarke (2005) proposed an ecological theory of music listening. The act of listening is an important component of Clarke’s theory. Clarke explained that perception should be understood based on a relationship between what is available in a person’s environment and the ability of the listener to make meaning from what they hear. Clarke stated that “the myth of passive listening is strongest where music presents itself (or is socially constructed) as having no function: in other words within the ideology of autonomy” (p. 205). Clarke explained that:

While autonomy and ecology seem so incompatible, ecological theory provides a way to understand how music is able to move seamlessly between autonomy and heteronomy by means of the same perceptual mechanisms: sounds specify and afford—and can specify and afford sources and actions which are either
predominantly immanent to the musical material or predominantly “worldly.”” (Clark, 2005, p. 205)

In Clarke’s theory, music and listening to music are not autonomous. Music, the act of listening to music, the listener’s attitude and ideas about the music, and the environment around them all contribute to what the listener hears. The music is not separate from the environment, and listening is not a separate act from the music. Simply, Clarke’s theory is based on the idea that that the listener and the listener’s environment are related and both affect what the listener perceives when listening to music. The listener and their environment are not isolated (p. 132).

Clarke’s (2005) ecological approach to the perception of music meaning is based on James Gibson’s (1986) ecological theory of visual perception. Gibson (1986) theorized that perception is direct; meaning that what is present in the environment provides a person with enough information to interact with the world around them (p. 238). One important component of Gibson’s (1986) theory is the concept of invariants. Invariants are something that does not vary, but is always the same as we move throughout our environment (p. 134). The other important component of Gibson’s (1986) theory is the concept of affordances. Affordances are things in our environment that assist a person with perception (p. 127). Affordances in Gibson’s (1986) theory of visual perception included height, size, light patterns, brightness, and texture (p. 143).

An ecological theory of perception of musical meaning based on a theory of visual perception is important for music educators to understand when considering the effect of presentation mode on a student’s response to a musical event. The concepts of invariants and affordances in Gibson’s (1986) theory are directly related to Clarke’s
(2005) theory. Both Gibson (1986) and Clarke (2005) noted that an ecological approach to perception “emphasizes the structure of the environment itself and regards perception as the pick-up of that already structured perceptual information” (Clarke, 2005, p. 17; see also Gibson, 1986, p. 238). Essentially, an ecological approach to perception emphasizes the environment where a person experiences listening to or seeing an event and that what he/she experiences is based on cues from the environment around them.

In his theory, Clarke (2005) assumes that perception and meaning are closely related because when a person perceives what happens around them, he/she tries to understand and adapt to his/her environment (Clarke, 2005, p. 7). Gibson (1986) stated that perception is direct and adapting to the environment is an unconscious reaction based on the theory of invariants and affordances. Clarke (2005) also focused on direct perception. Although adaptation to the environment may be unconscious, the adaptation is based on changes in the environment that inform the listener of what has changed or not changed and can alter the listener’s perception of what they have heard. Within the environment of the music classroom, there are many things that a student can perceive and attempt to adapt to. A student can hear him or herself or others around them, hear and see another student playing or singing, hear or see the teacher, and see the classroom environment around them. In a music appreciation classroom, a music educator can present a music listening experience using any of the presentation modes described affecting the environment. This requires students to adapt and affects the way that meaning is created. Students can listen to a recorded piece of music, watch and listen to the recorded performance of a piece of music, or even experience a live performance of a
piece of music. Using an ecological framework, students’ ability to recognize and perceive meaning in music that they listen to affects their future actions and behaviors (Clarke, 2005).

Deutsch (1999) discussed music perception in terms of what Clarke (2005) called the “information-processing approach” (p. 11). Using this approach, the environment is not structured; rather, it is “imposed on an unordered or highly complex world by perceivers” (Clarke, 2005, p. 12). Using the information-processing approach to music listening, music educators subscribe to a hierarchical understanding of the music listening process that includes a “bottom-up” trajectory that all students would follow to perceive meaning in music (see Figure 1). Clarke (2005) explained that the mental/social/cultural domain is at the top of the process and can be perceived consciously or unconsciously by the listener; however, the information processing approach is not unidirectional. The “flow” in ecological theory can be considered to operate “top-down” or multi-directionally (Clarke, 2005, p. 14).

Application of the top-down approach in an investigation of music listening in the music appreciation classroom may have an important impact on a music educator’s ability to understand how students create meaning and engage with music. If aesthetic value (mental/social/cultural domain) is at the top of the information-processing model, then it would be the last domain explored using a bottom-up approach. It is possible that many students feel engaged with music based on its aesthetic value first influenced by the way it is presented to them and their prior musical experiences mitigated by their musical training and age. The idea that top-down processing can occur is important because
“perception is always influenced and informed by whatever was happening immediately or beforehand, as well as by more generalized preconceptions and expectations derived from previous experience” (Clarke, 2005, p. 14).

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(Subjective to the individual listener)

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(Objective based on what is being listened to)

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<td>Sounds in the environment</td>
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*Figure 1.* Schematic of information-processing approach to music perception adapted to show differences between a bottom-up approach and top-down, multidirectional approach related to ecological theory. Adapted from *Ways of Listening: An Ecological Approach to the Perception of Musical Meaning*, by E. F. Clarke, 2005, p. 13. Copyright 2005 by Oxford University Press. Reprinted and adapted with permission.
If there is a difference in emphasis of one stage or another, that difference could affect
different possible paths within the model. Therefore, in the ecological theory posited by
Clarke (2005), a top-down or multidirectional approach requires further investigation.

In the ecological approach to perception, the world is viewed as a “highly
structured environment subject to both the forces of nature...and the profound impact of
human beings and their cultures; and in a reciprocal fashion perceivers are highly
structured organisms that are adapted to that environment” (Clarke, 2005, p. 17). This is
an important consideration when teaching listening skills in the music classroom.
Students have to adapt to their environment, especially in higher education. The students’
education may not take place in the same classroom or building from class to class, be
guided by different instructors, and the materials used for their education—especially
listening examples—can be presented using different presentation modes. Moreover,
students could be subject to enculturation based on their use of different presentation
modes available to them outside of the music classroom. Students must adapt to the
presentation mode being used based on the culture within the classroom and tools
available to them, which may not be the same as those available outside of the classroom.
The classroom environment may or may not be highly structured and the student is
subject to the forces and culture within the classroom.

Clarke (2005) noted that “what is important is to consider what is directly
specified by environmental information—not what a perceiving organism can interpret in,
or construct from, a stimulus” (p. 17). Properties of a musical performance can be
directly communicated to a student. The student “does not have to do complex processing
to ‘decode’ the information within the source [but the student] needs to have a perceptual system that will resonate with the information” (Clarke, 2005, p. 18). If students are able to hear, then the ability of a performance to “resonate” with them—that is that the environmental information reinforces their perception—could be affected by the presentation mode. If what a student hears is presented using different presentation modes, it is plausible that the meaning of what the student heard will change.

Within an ecological theory of perception of musical meaning, three factors are important to consider: perception and action; adaptation; and perceptual learning. Perception and action are related in the sense that perception is “seeking out sources of stimulation in order to discover more about the environment” (Clarke, 2005, p. 19). Central to Clarke’s (2005) theory “is the idea that the perceiver/event relationship affords action” (p. 204). If this is true, then it is important that music educators understand how students react to and perceive the quality of a musical performance using different presentation modes if music educators are to impact the actions of students’ music education through listening in and outside of the music classroom. Students may seek out different ways of listening depending on preferred presentation mode. Students can enjoy listening to music: (a) using auditory-only stimulation; (b) using audio-visual live stimulation (i.e. listening to and watching a live performance); and (c) using audio-visual recorded stimulation (i.e. listening to and watching a recorded music performance). The introduction of a visual stimulus during the music listening experience is an alteration of the environment that could affect students’ perception of meaning dependent on the presentation mode. Therefore, the addition of a visual stimulus to auditory experiences
requires students to adapt to their environment.

In Clarke’s (2005) theory, adaptation is defined as something that is not done by chance, but the product of mutual adaptation between an organism and their environment, which is a key component of the evolutionary process (p. 20). Human beings have sought out different opportunities for music making, adapted and enhanced those opportunities through the creation of different tools and technologies that suited their purposes (Clarke, 2005, p. 21). The purpose of the adaptation is to sustain and explore musical opportunities within the environment, which is a primary concern in perception. Furthermore, learning to listen to music can be indirect or directed, meaning that some listening experiences require no explicit training while other experiences are directed to point out distinctions to others (Clarke, 2005, p. 22). Students are constantly adapting to their environments and the world around them based on the tools available to them or creating new tools to suit their needs for music listening. Adaptation may include seeking out different venues and experiences for music making, obtaining new technology to listen to and experience music, or creating music of their own. Although perceptual learning may include both indirect and direct learning, indirect perceptual learning still takes place in the music classroom.

When a student is asked to describe a piece of music, or what they perceive within a piece of music, their training and previous experiences affect both description and perception. A student’s training is individual and subjective to their unique experiences within the world. Music appreciation courses may include directed perceptual learning; however, the indirect perceptual learning that students experience outside of the
classroom, and the changes within the environment based on how music is presented to them, impact the students' perceptions of the overall quality of the performance. If this is true, then the subjective nature of perception based on an ecological theory of music listening is important to investigate to begin to understand this phenomenon within the context of the music classroom.

The ecological theory of listening posited by Clarke (2005) is partially based on the concept of invariants in perception. Clarke (2005) noted that because of adaptation and a person's need to know what is going on in his/her environment, an ecological approach emphasizes the "importance of information as information for something (objects and events)" (p. 32). Clarke (2005) explained:

It is the objects and events that are specified in perception that are important [and] when perception proceeds in an unproblematic way, we are usually unaware of the sensory aspect of the stimulus information, and are only attuned to the events that are specified by stimulus structure (i.e. the music and sounds themselves) (p. 32).

If this is true, then the presentation mode for teaching listening skills and for music listening experiences should not have an effect on the student's perception of the overall quality of a music performance. If Clarke's (2005) theory is true, then using different presentation modes would not matter. In theory, the stimulus, or combination thereof, may have an effect on the student's environment and the sensory aspect of the stimulus information may have an effect on the student's perception of quality of the performance based on the presentation mode used to transmit information.
Music
Reference systems, genres, idioms, styles, pieces
Complexity, familiarity, orderliness
Prototypicality
Performance contexts: live, recorded, non-musical

Situations and Contexts
Social and cultural contexts
Everyday situations: work, leisure, consumer, education, health, media, entertainment
Presence/absence of others
Other ongoing activities

Response
Physiological: arousal level
- Level of engagement
- Active/passive control of listening
Cognitive
- Attention, memory, perceptual coding, expectation
- Discrimination, evaluation
Affective: emotional responses, like/dislike, mood

Listener
Individual difference variables: gender, age, nationality
Musical knowledge, training, literacy, experience
Immediate and short-term preference patterns: medium/long term taste patterns
Self-theories: musical identities

Based on Clarke’s (2005) ecological theory of music listening, Hargreaves et al. (2005) and Hargreaves, North, and Tarrant (2006) have proposed a “reciprocal feedback model” (see Figure 2) for music listening (Hargreaves, Hargreaves, & North, 2012, p. 157). Hargreaves et al.’s (2005) model is based on the premise that “three main determinants of any listening response are the characteristics of the music, of the listener, and of the listening situation” (Hargreaves et al., 2012, p. 157). The characteristics of the music, the listener, and the listening situation are important considerations for music educators to understand how students respond to different music listening experiences. Based on Clarke’s (2005) theory and Hargreaves et al.’s (2005, 2006, 2012) reciprocal feedback model, several important questions arise that require further inquiry to inform music educators’ understanding and teaching of music listening and cognition in the classroom. For example, individual characteristics unique to the student (listener) including gender, age, and musical training could affect their response to music. The performance context (presentation mode) might have an effect on student responses to a musical event. Student responses could be based on cognitive (evaluative) or affective (emotional) reactions to the music.

Both Clarke (2005) and Hargreaves et al. (2012) emphasized the importance of the environment, and thus the students’ need to adapt to the environment and to afford meaning on musical experiences based on their perception of music. Therefore, it is imperative that investigation about how presentation modes affect a student’s perception of the quality of and engagement with music during listening experiences be undertaken to help music educators understand this phenomenon in the context of the music
classroom. The music listening experience is not only important in music education philosophy, and as an aim of music education, but is directly related to many of the views of music listening previously presented. Based on Clarke’s (2005) ecological framework (Clarke, 2005) and Hargreaves et al.’s (2012) reciprocal feedback model, the presentation mode used in a music listening experience may have an important impact on students’ perceptions of the quality of and engagement with the music during a musical performance. Additionally, understanding how students’ individual factors such as age, gender, and musical training demonstrated in Hargreaves et al.’s (2005, 2006, 2012) model may have important implications for how music listening is taught in community colleges. The presentation mode is a method of communicating a musical idea to students, and the presentation mode may cause the student to afford meaning differently. If true, this will have important implications for music educators when engaging students in listening experiences.

**Need for the Study**

Although the existence and use of different presentation modes (live, audio-only, and audio-visual) is well established in music education (Enders, 2002; Finnäs, 1987, 2001, 2006; Killian, 2001), and students’ responses when listening to music have been well documented (Dunn, 2004, 2008; Kerchner, 2000) further inquiry regarding the effects of different presentation modes on students’ perception of the quality of a musical performance and engagement in the music while listening is needed. The presentation modes used for teaching music listening skills require further study because the medium (presentation mode) itself may be considered an aesthetic object by students both in and
out of the music classroom (Levitin, 2008). Because of the abundant use of technology used for music listening, it is important for educators to understand how students respond to music using different presentation modes. This is especially true if music educators want listening skills to remain relevant to students and be used outside of the music classroom.

Cognitive and affective responses to music are based on a student’s interpretation of what has been communicated from the performer (Byrne, 2005; Hargreaves et al., 2005; Sloboda, 2005; Sloboda & Juslin, 2010). Part of the performance, regardless of presentation mode, may include both aural and visual components. The presence or lack of either aural or visual components may affect students’ perception of the quality of the performance. Moreover, students’ responses to a musical event are subjective because there are a variety of ways to listen to music that are context dependent. Because the response to a musical event and the listening context may influence an individual’s response (Juslin & Laukka, 2003; Woody, 2006a, 2006b), other individual factors including a student’s age, gender, and prior musical training may affect how the student responds during music listening (Hargreaves et al., 2005, 2006, 2012).

For community college music educators and students, understanding how individual students respond to a musical event when different presentation modes are used may be extremely useful. Because I want to know if individual factors including age, prior musical training, and gender affect perceptions of quality and engagement, studying community college students makes sense because they are a more diverse student body. Students at community colleges are often more diverse than those attending
four-year institutions. Although many researchers have studied music listening in a variety of contexts, none have focused on music appreciation courses. Scholarly inquiry regarding the music education of a broad cross-section of students in higher education, whose educational goals may not include a bachelor’s degree, will strengthen what music educators know about the presentation modes they use for music listening in the classroom.

**Purpose of the Study**

The purpose of this study was to examine the effect of presentation mode on community college students’ ratings of a choral performance and self-perceived level of engagement with the music controlling for age, gender, and previous musical training.

**Research Questions**

The following research questions were developed based on the purpose of the study:

1. What effect, if any, does presentation mode have on participants’ ratings of the quality of a choral performance?
2. What effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of the quality of a choral performance?
3. What effect, if any, does presentation mode have on participants’ ratings of their engagement with the music during a choral performance?
4. What effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of their engagement with the music during a choral performance?
5. Why do participants rate the quality of a choral performance of one presentation mode higher than others, if at all?

6. Why do different presentation modes make participants feel more or less engaged with the music, if at all?

**Definition of Key Terms**

Presentation Mode: The mode of transmission of musical stimuli to the listener in either a live or recorded format.

Live: Experiencing a musical event as it takes place and where it takes place without the use of recordings.

Audio-only: The use of only an auditory example with no intended visual component when experiencing a musical event.

Audio-visual: The use of both auditory and visual components when experiencing a musical event.

Recording: A reproduction of a musical event that can be transmitted multiple times without changes to the original performance.

**Delimitations**

There were several delimitations that were important considerations for this study.

1. The sample being studied cannot be stratified because demographic information about students in community college music appreciation courses in Oregon is not collected prior to enrollment. Students self-selected the course to enroll in and the term of enrollment.
2. Because a wide range of technological devices may be used for audio-only and audio-visual playback, and the same technology was not common to every data collection site, the specific technology used is not being studied.

3. The population and sample were limited to the Mid-Willamette Valley in the State of Oregon due to monetary constraints of travelling with a live choir necessary for this study. Round trip travel to each data collection site was completed within a single day on each day of data collection.

4. Although a fourth presentation mode, live audio-only, is possible, it is not typical or commonly used as a teaching method in music appreciation courses and has not been included in the present study.

5. There are many factors that are individual to the student including race. Due to the relatively low racial diversity of the sample population being studied, race was not controlled for in the present study.

6. Choral music is the only musical genre used in the present study. Choral music ensembles were the only common ensemble available at all of the data collection sites. Moreover, data collection was timed to coincide with exploration of English Madrigals in each of the courses where data collection took place. Additionally, I used my own choral ensemble for recording preparation and the live performance. I used a mixed methods, descriptive research design. Inferring any causality on the basis of the data is likely to be tentative because other interpretations and conclusions are possible (Gall et al., 2007, p. 310). Only possible interpretations and suggestions for future empirical research can be made based on the data analysis.
Chapter Sequence

In Chapter 2, I present relevant literature related to the purpose of the study and its relationship to the research questions I intend to answer. The discussion includes themes based on my review of the relevant literature and identification of the gaps in the literature that I intend to fill. The gaps I have identified in the current literature support my investigation into my topic of inquiry and my contribution to knowledge within the field of music education. In Chapter 3, I outline the methodology I used to complete the study including the research design, population to be studied, participant selection, sampling, procedures, data analysis, and instrumentation. I present the quantitative results of the study in Chapter 4 and the qualitative results in Chapter 5. I discuss the results, conclusions, and identified implications the results of the study may have for music educators and music education in Chapter 6.
CHAPTER 2

Review of Literature

During my review of the relevant scholarly literature, several themes emerged: (a) presentation mode may affect listeners’ affective and cognitive responses to music especially related to instruction, performing, and focus of attention; (b) cross-modal interactions occur during music listening; and (c) factors such as age and gender influence students’ ability to assess music performances. Each theme is directly related to, and supports the purpose of the research questions that have been addressed in this study. Summaries of the relevant literature support the need for the study, identifying a clear gap in the literature that the proposed study will fill, and support the design of the study. The research questions for this study were designed in response to unanswered questions in extant research.

In the review of literature, I discuss extant studies that researchers have conducted to examine listeners’ affective and cognitive responses to music in addition to the effects of instruction, performance, and the listening experience itself. Second, I discuss cross-modal interactions in music listening. During a music listening event a listener may experience either auditory stimuli alone or a combination of auditory and visual stimuli simultaneously. The introduction of visual stimuli and the interaction of both auditory and visual stimuli during a listening event could have some important implications for the present study. Finally, I present influences on listeners’ ability to access musical performance including factors present in performance, listener age, and listener gender.
Presentation Mode May Affect Listeners' Response to Music

Many researchers in music education have investigated how presentation mode affects listeners' impressions of musical performances and how listeners respond to different presentation modes. Students respond to different types of performance mediums in a variety of ways. They may have different affective or cognitive responses (Dunn, 2004, 2008; Geringer et al., 1997; Lychner, 2008), respond to emotional stimuli (Ebie, 2004), perceive a varied amount of musical information when different performance mediums are used (Killian, 2001), or rate performances in certain modes more favorably (Howard, 2012). Wivliet & Vrana (2007) suggested that "affective accounts often emphasize the adaptive features of preferring familiar objects, which are more likely to be safe in comparison to potentially threatening novel stimuli" (p. 4). If this is true, then affective responses to a music listening experience may be influenced by a student's familiarity with both the piece of music being listened to and with the presentation mode. For example, Keown (2012) found that adolescent students use audio-visual and audio-alone media to listen to music, but that the students preferred on-screen audio-visual media. This is important if presentation modes are considered aesthetic objects as Levitin (2008) suggested. The mode used to present a performance may affect the overall impression of a musical performance or listening activity in the music education classroom. Therefore, presentation mode could affect how educators subsequently engage students in music listening experiences in the classroom, and how students perceive their own engagement when listening to music.
Affective responses. Students' affective responses to music, when engaged in a listening experience, may be based on a variety of factors. Students' judgment may reflect their current mood (Clore & Huntsinger, 2007, p. 393). Andrade (2005), a consumer researcher, noted that in static affective evaluation theories, a person's current affective state may bias their evaluation and actions congruently, meaning that “positive affect is expected to lead to a more favorable evaluation of the environment... whereas negative affect is expected to lead to a less favorable evaluation” (p. 355). Juslin and Västfjäll (2008) posited that people value music primarily because of the emotions it evokes (p. 559). Therefore, a student's affective state, when engaged in a music listening experience, may have an effect on their evaluation of the quality of what they have experienced.

Many researchers have investigated and demonstrated that a person may have a variety of affective responses when listening to music (Adams, 1994; Finnás, 1987; Juslin, 1997, 2009; Juslin & Laukka, 2003; Juslin & Västfjäll, 2008; Lindström, Juslin, Bresin, & Willamon, 2003; Sloboda & Juslin, 2010; Thompson & Schellenberg, 2006). In a study about the intuitive ways that students listen to music, Dunn (2004) explored undergraduate college students' use of figural maps to represent an excerpt of Delibes' “Waltz” from Coppelia (p. 5). Participants were given no direction on how much time to spend on the exercise or the form the map needed to take. The purpose of the map was for participants to accurately represent what they felt or heard (p. 5). The maps were a qualitative way to understand how participants respond to music. Dunn noted the listening maps were an effective way to understand the intuitive listening process,
especially since each of the maps is unique to the individual. In fact, listening to music is a process that is unique to each individual. In Dunn’s study, there was no mention of differences in age or gender based on interpretations of the listening maps. If the meaning students make from the listening process is unique to the student, it may be important to understand how individual attributes including age, gender, and previous training are related to students’ affective and perceptual responses to music. Moreover, understanding why students respond differently to a piece of music based on their qualitative explanations of their responses requires further inquiry.

Researchers have suggested that affective responses to music may be linked to presentation mode (Ebie, 2004; Geringer et al., 1997). Ebie (2004) investigated methods for teaching appropriate emotion performance techniques to middle school vocal students. Students learned a conjunct modal melody, and performed it *a cappella* after receiving either verbal, vocally modeled, kinesthetic, or audio-visual stimuli to elicit the desired emotion students were to portray (p. 405). The students’ performances were videotaped and rated by three judges using a five-point Likert-type scale (p. 408). There was moderate to low inter-judge reliability for anger (α = 0.49) and fear (α = 0.43) (p. 410). Ebie found that participants preferred aural modeling (M = 3.65) most, but also preferred audio-visual learning (M = 3.59) as methods to learn how to demonstrate emotion in vocal performance (p. 415). Furthermore, performances that were based on verbal instruction were rated significantly lower than those based on aural modeling (p < .001) and audio-visual learning (p < .02) (p. 411). Although aural modeling and audio-visual learning were most preferred by students, the presentation mode may have affected
the judges' ratings of students' performances. It can be argued that vocal modeling and audio-visual stimuli are similar because both are seen and heard, but one is live and one is recorded. If Ebie had demonstrated vocal modeling using different presentation modes, such as an audio-only recorded stimulus, then the students' preferences may have been different. Additionally, because Ebie studied a sample of students who are closely related both by age and previous musical training, it is unknown whether preference would have changed based on differences in either factor.

Similar to Ebie (2004), Woody (2006a) examined three types of instructional conditions, including verbal instructions using musical properties, imagery and metaphor, and aural modeling (audio-only recording) with university undergraduate and graduate piano students (p. 23). He compared the participants' ability to match the expressive qualities of an expert pianist's performance of a melody using a pretest-posttest design (p. 27). Woody found strong correlations between participants' and experts' performances using aural modeling for loudness ($r = .89$) and articulation ($r = .93$), and a moderately strong correlation for tempo ($r = .66$), depending on which melody was being studied. Additionally, he noted that aural modeling was consistent in helping participants produce performances similar to the expert model used in instruction. None of the instructional models was consistently more successful than the other (p. 32). The results of this study are important because it is clear that students can learn elements of performance based on how the material is presented to them.

It is important to remember that the aural modeling condition yielded higher correlations than the other instructional models. Rather than using audio-only stimulus,
an audio-visual modeling of the performances may have yielded even stronger results because the participants would have seen the techniques used and the expressions of the expert pianists as they demonstrated each melody. Moreover, a different presentation mode may have created a strong self-perceived level of engagement with the music that may have yielded strong results. Woody also did not investigate if there were any differences for male or female students, or if their previous training had any effect on their success.

Geringer, Cassidy, and Byo (1997) investigated the effects of different types of visual stimuli and music-only stimuli on non-music students’ responses to both cognitive and affective questions about the music (p. 224). The researchers found a significant difference between groups that viewed performances of a Beethoven symphony with two different types of visual stimuli (Mvt. 1: $F[3, 124] = 3.05, p < .04$; Mvt. 4: $F[3, 124] = 2.73, p < .05$) (p. 230). The researchers found a significant difference ($F[1, 124] = 21.88, p < .001$) related to liking, with preference for music plus video among participants (p. 227). Rank-order analysis revealed significant differences between group means on affective responses of all excerpts used in the study ($\chi^2[8, 4] = 12.23, p < .01$) (p. 230).

Contrary to Geringer et al.’s (1997) findings, Lychner (2008) studied the responses of university non-music and music majors’ affective responses to audio-only and audio-visual stimuli. Lychner (2008) discovered that non-music majors had stronger affective responses to audio-only stimuli ($r = .87$) than audio-visual stimuli ($r = .75$) (p. 29). In Geringer et al.’s (1997) study, students’ affective responses were evidence that students responded differently to various performance mediums, with a stronger response
to audio-visual stimuli. Lychner (2008) found that audio-only stimuli received a higher affective response. Neither Geringer et al. (1997) nor Lychner (2008) used a live format. Performance medium was not an exhaustive variable in either Geringer et al.’s (1997) or Lychner’s (2008) studies. If students respond differently to various performance mediums, then their responses to music presented using different presentation modes may have important implications for music listening in the music education classroom.

Based on the contradictory results of Geringer et al. (1997) and Lychner’s (2008) studies, several questions remain that require further exploration. For example, if students respond differently to various presentation modes, then further understanding of the listening phenomenon when listening to music in different presentation modes is needed. Additionally, if students have higher affective responses in one presentation mode when compared to another, then it is important to understand why there is a difference in responses for different presentation modes. More importantly, students are unique individuals and factors such as age, gender, and their previous musical training may influence their perceptions of what they have heard and how engaged they feel when listening to each musical example. Because further scholarly inquiry is necessary to answer these questions, each of these questions has been considered in the development of the research questions to be answered in the current study.

Wivliet and Vrana (2007) examined exposure effects on liking, self-reported affect, and physiology in response to selected audio-only stimuli that varied in valence and arousal (p. 3). Sixty-seven university psychology students volunteered to participate in the experiment and were rewarded with course credit (p. 7). The stimulus materials for
emotion included 34 pieces, each 26-seconds long, of instrumental music without lyrics (p. 8). During the experiment, the researchers attached electrodes to subjects to monitor physiological changes including heart rate and facial responses. After listening to each excerpt individually, each participant rated their pleasantness, liking, and familiarity with the stimulus. Analysis of variance was used to compare repeated measures of valence (positive or negative emotions), arousal, and exposure. Researchers found that participants liked music that was positive significantly more than they liked music that was negative \(F[1, 61] = 119.8, p < .001\) (p. 11). There were no significant differences between liking high versus low arousal music \(F[1, 61] = 2.89, p < .10\) (p. 11).

Additionally, Wivliet and Vrana found that exposure to music stimuli did not increase participants' liking of a musical excerpt \(F[1, 62] = 1.88, p > .05\). The researchers also examined the students' physiological response to music (p. 11). Positive music promoted higher reactivity scores than negative music \(F[1, 60] = 6.32, p < .02\) and was highest when music was considered both positive and arousing \(F[1, 60] = 4.30, p < .05\) (p. 13).

Wivliet and Vrana's (2007) research results have important implications for this study. The research participants had both positive and negative reactions to different musical stimuli. Although participants' reactions were consistent with the emotion (positive or negative) associated with each excerpt, it is unknown how the participants would react to hearing an entire musical work. When listening to an entire musical work, it is possible that emotional associations and arousal could vary. It is possible that students' perceptions of, and subsequent appreciation for, the musical work could change as they listen to the entire piece, resulting in a different overall rating of the quality of the
Based on the studies previously discussed, it is clear that students’ affective responses to music during the listening experience vary. There is not a “one size fits all” model for teaching music listening skills. After reviewing the work of Ebie (2004), Geringer et al. (1997), Lychner (2008), Witvliet and Vrana (2007), and Woody (2006a), several questions remain unanswered. Each of the researchers used different samples of students from either middle school or four-year universities. Some of the four-year university students were music majors or performers and some were not. Participant age and level of musical training were not defined in several of the studies. Additionally, the researchers did not control for gender in the studies previously discussed.

Based on the review of the extant literature regarding listeners’ affective responses to music, several important questions remain unanswered or have not been investigated. For example, a student’s age, gender, or amount of previous musical training could have an effect on students’ perceived level of engagement during music listening experiences but were not controlled for in any of the previous studies. Additionally, the question of why students might rate a performance using one presentation mode higher or lower than another requires further inquiry. Moreover, individual factors unique to the student or environment may influence students’ perception of a listening event but have not been accounted for in the extant literature. Each of the listening experiences used in the previous studies were context dependent. The contexts were all different and not typical of traditional American community-college music appreciation classroom. Considering Clarke’s (2005) theory, and
Hargreaves et al.'s (2012) model of music listening, it is unknown whether or not students' ratings of quality and level of engagement during music listening experiences based on different presentation modes would change in different listening contexts. Therefore, it will be important to consider both quantitative and qualitative data collection for the present study. Students' affective responses may influence their response to a musical event, and therefore will be important to examine in the coding of qualitative data collected to better understand students’ affective responses when listening to music in a music appreciation classroom.

**Presentation mode affects perception.** A student's perception of a musical performance is influenced by presentation mode. Woody (2004) stated that "listening experiences in the music classroom can potentially lead to the most important dimension of music learning for students....Teachers should strive to use music recordings in a way that portrays listening as an engaging and enjoyable activity" (p. 38). If music teachers use music recordings that portray listening as an enjoyable activity, then students may feel more engaged in the music listening experience. Due to the plethora of technology available for music listening, it is unknown if the use of audio-only, audio-visual recordings, or live music performance may have a stronger effect on students' perceived level of engagement during a listening experience. Wang (2012) suggested that different presentation modes for music have an effect on college students' listening behaviors. Dekaney (2012) suggested that students' exposure to live performances affected their preferences for Brazilian music. Lindström, Juslin, Bresin, and Willamon (2003) found that different presentations modes, especially the use of computer aided audio-visual
instruction, are being used for instruction in the music classroom (p. 27).

In a study of perceptual strengths in music listening, Dunn (2008) noted that the "presentation mode appeared to qualitatively change the music listening experience for some students" (p. 47). He studied 16 third-grade students and their perceptual strengths using a music listening task including audio-only, audio-visual, and audio-kinesthetic (listening and movement) stimuli. During this qualitative study, the subjects experienced six pieces of music presented during six sessions with each piece presented in a randomized order using a different presentation mode during each session. Subjects' responses were audio-taped and video-taped and later transcribed. The data were reported using thick description and validated using a peer review process by music educators familiar with verbal reports (p. 51). Based on observations of the subjects, Dunn noted that many of the subjects' responses changed based on the presentation mode. For example, many of the subjects seemed to almost have to force themselves to concentrate during the audio-only presentation while appearing more focused during audio-visual listening activities (p. 70). Moreover, Dunn determined that subjects were able to make more comments generally, and musical perceptions specifically in response to the audio-visual presentation mode. The subjects in this study appear to have had qualitatively different responses to music listening tasks as a result of the presentation mode. The subjects examined in the study were relatively the same age. Additionally, the data that Dunn collected were not collected in a typical music classroom. Because a student's experiences with music may change as they grow older, it is important to explore the community college students' responses to music based on presentation mode both
quantitatively and qualitatively to be able to understand the phenomenon. In addition, it will be important for music educators to understand if students’ responses to music listening exercises are different in the actual environment where students engage in music listening, unlike in Dunn’s study where there environment was atypical of the traditional music education classroom.

Geringer and Dunnigan (2000) investigated whether digital or analog concert recordings had an effect on listeners’ perception and preferences for unedited concert recordings of a mixed choir, string orchestra, wind ensemble, or solo piano. Participants in the study included 40 music majors assigned randomly to two listening conditions: listening with high quality headphones and listening with stereo loudspeakers (p. 4). Participants were tested individually and allowed to switch between two versions of concert recordings formatted onto digital and analog tape as much or little as they wanted to (p. 5). Participants were asked to judge each version of the concert recordings separately, rating the quality of the bass, treble, blend, and the overall quality of the recording on a seven-point Likert-type scale (p. 6). Although there was no significant difference regarding headphone or loudspeaker listening conditions, there was a significant difference for digital versus analog presentations \( (F[4, 35] = 12.52, p < .001) \), and for overall quality \( (F[1, 38] = 43.83, p < .001) \).

Although Geringer and Dunnigan (2000) found that music majors listening to concert recordings preferred digital recordings more, several key issues remain to be addressed. First, the researchers used a laboratory model instead of a traditional classroom experience. Students were treated individually, not as a group, which is the
more common occurrence in the classroom. Second, participants were music majors. Typically in a community college environment, students who take a music appreciation course are not music majors and have a wide range of music backgrounds. The effect of musical background on students' perceptions of what they are listening to is not known. Third, participants did not see the performers; they only listened. It is unknown whether seeing the performances would have affected the results. Finally, participants listened to recordings and did not listen to or see a live performance. Participants may have perceived or preferred a live performance differently compared to recordings. Many of the variables that may affect a student's perception of a musical performance were not included in this study. Although many of the variables that may affect a student's perception of a listening experience are individual and unique to the student, the listening experience in community college music appreciation courses is often not a one-on-one experience.

Considering Clarke's (2005) and Hargreaves et al.'s (2012) theories and model, and the extant literature about how presentation mode affects listeners' perception of, and engagement during a music listening event, key questions still remain unanswered. In a regular classroom setting, whether presentation mode has any effect on a student's perception of the quality of a performance requires further exploration. Additionally, ecological elements such as presentation mode and whether individual factors related to a student affect their responses to a music listening event has not been examined. Moreover, why students respond differently to different presentation modes and if factors that are unique to the student affect their ratings of and perceived engagement with a
music listening experience requires further inquiry. Each of these ideas are directly related to purpose of the present study to examine if presentation mode has any effect on students’ ratings of the quality of a choral performance (music listening event), and perceived engagement with the music while listening controlling for individual factors of age, gender, and previous musical training. Further research is needed to understand how multiple individual factors and presentation mode affect students’ perception of performance quality and feeling of engagement when listening to music in a traditional music learning context.

**Cognitive responses.** The creation of art is a cognitive act (Levitin, 2008). As listeners, people have the ability to shape the creation of art through appreciating and actively participating in the music listening experience. Music listening may elicit both cognitive and affective responses. In a study of 832 adolescent students, Finnás (2006) found that most students’ musical experiences were related to listening and that music was the discipline that most frequently evoked experiences (p. 315). A variety of different factors may affect students’ cognitive responses when listening to music, including instruction and focus of attention.

**Instruction, performing, and listening.** Woody (2006b) examined the cognitive processes of musicians using imagery to improve musical expression in performance, especially how musicians use images to develop plans for the sound of music. Subjects included 84 graduate and undergraduate music majors. The materials included three melodies (p. 128). Subjects were provided with an imagery-based text with instructions for making their performance of each melody expressive. Woody asked subjects what
they were thinking as they prepared to perform each melody and after they performed the melody. Subjects wrote their thoughts about each melody as they practiced for their final performance and rated the effectiveness of the instruction on a five-point Likert-type scale (p. 130). Woody developed a cognitive translation index using scores assigned to the written responses regarding how subjects translated imagery into plans for performance, and found that musicians use a variety of cognitive strategies when dealing with mental imagery (p. 130). Most importantly, Woody noted that musicians’ written comments suggested that they must master the technical performance aspects before they can consider expression (p. 134). This finding has important implications for the present study. Many methods for teaching listening skills focus on listening critically to different structures within the music itself, including expressive elements and emotion (Burz & Marshall, 1999; Elliott, 1995; Reimer, 2003). Considering Clarke’s (2005) ecological theory and Hargreaves et al.’s (2012) reciprocal feedback model of music listening, it is possible that listeners respond to performances based on their interpretation of the overall musical expression, as posited by Elliott (2005).

Linklater (1997) asked 146 fifth- and sixth-grade students to practice playing a clarinet using a modeling videotape, modeling audio-tape, and non-modeling audio-tape. He assessed the students’ achievement at the end of an eight-week instructional period (p. 404). Two independent judges rated the subjects’ video and audio taped performances. Linklater found no significant differences between the different practice conditions; however, using Tukey Honesty Significant Differences multiple comparisons, Linklater did find a significantly higher score on the visual/physical performance criteria for
students using the modeling videotape \( (df = 131, \text{mean difference} = 2.19, p < .05) \) (p. 409). Although few significant differences were found for performance measures in Linklater’s study, it is unknown whether the same would be true for videotape (audio-visual), audio-only, or live models of performances used to teach listening skills. Linklater’s subjects were not asked which of the three models they preferred. There was evidence that students who used the modeling videotape practiced more. Even if performers need to master technical aspects of musical works as posited by Woody (2006b), the type of stimuli used in the instruction—auditory, live, or audio-visual—may impact student success. From the perspective of a musical listener, the use of audio-visual stimuli, versus a single stimulus, may affect students’ practice habits, preparation, and responses to music. Therefore, the use of different presentation modes in instruction could have an effect on students’ perceptions of different stimuli and achievement both in and outside of the music classroom. If this is true, it is important for music educators to understand whether presentation mode has any effect on students’ perceptions of the quality of a musical performance, and their perceived level of engagement with music for a presentation mode specifically during the music listening experience. If community-college music appreciation instructors intend to develop the listening skills and appreciation of music in both general, and music education curricula, understanding the effect of presentation mode on listeners’ perceptions of and engagement with a listening experience will have strong implication for their teaching pedagogy. Further research is needed to understand this phenomenon in the context of the music appreciation classroom.
Listening and focus of attention. Many researchers have investigated students' focus of attention when listening for multiple musical factors in choral and instrumental music performances (Napoles, 2009; Geringer & Madsen, 1995/1996; Madsen & Geringer, 1999; Madsen, Geringer, & Heller, 1993). Napoles (2009) found that when university musicians listened to an excerpt of a choral performance using a musical score, ratings of the performance were higher than when they listened without the score. Having the score may have been a distraction to listening critically to the performance (Napoles, 2009, p. 272). Moreover, the presence or absence of the score when listening to each excerpt of a choral performance may have affected the meaning of the experience for the listener. Dunn (2006) defined listening as an “active, conscious, interested, invested, focused” process where the listener is “looking for meaning” (p. 37) noting that “some of the ways that we have engaged students in musical listening are not the most effective because they do not align with the ways that people listen to music in their daily lives” (p. 34). Perhaps this is why participants in Napoles’ (2009) study rated performances higher without the score. The meaning of the listening experience for the subjects in Napoles’ (2009) study may have been altered by the presence of the score because meaning could be in the score (what to listen for) rather than in what is actually heard without the score (the sounds themselves). Therefore, it is also possible that music educators should consider how engaged students feel with the music and how it is presented to them during the music listening experience before engaging in analytical listening activities.

Geringer and Madsen (1995/1996) asked music and non-music majors to use a Continuous Response Digital Interface (CRDI) to indicate whether they heard rhythm,
dynamics, timbre, melody, or a combination of all four elements in 10 excerpts of instrumental music (p. 83). Participants also indicated their preference for each excerpt using a seven-point Likert-type scale (p. 82). Because the data were not normally distributed, the authors used nonparametric statistics in their analysis. Geringer and Madsen found significant differences between the number of participants who correctly and incorrectly identified the salience of the different musical elements ($\chi^2_{[5, 16]} = 10.50, p < .033$) (p. 86). It is important to note that the authors’ suggested the CRDI may have influenced results because of “differences in perceived focus when subjects manipulated” the CRDI (p. 86). Moreover, listeners may “focus attention on other musical elements not provided as options in this study...[and may be] affected by different styles, genres and functions of music in addition to context and other stimuli as well as subject variables” (p. 86). If students’ focus of attention is on multiple elements of musical work, and may be affected by different styles and genres, understanding how students react to a single musical genre may provide more information about the pedagogy for teaching both critical and analytical music listening skills. Investigation as to how students perceive the quality of the performance and engagement with the music of one genre may help music educators to engage students in more meaningful listening experiences for each genre of music students listen to. Furthermore, understanding how the presentation mode affects students’ perception of performance quality and level of engagement using different presentation mode may have additional implications on how to teach listening skills for different musical genres in the music appreciation classroom.

Madsen and Geringer (1999) compared music and non-music majors’ ability to
discriminate between good and bad tone quality and intonation of vocal and string performances presented in an audio-only format and used the CRDI for data collection. Subjects (N = 80) were able to easily discriminate between good and bad excerpts when focusing on multiple dimensions of performance. The researchers found a significant difference between subjects' identification of good or bad intonation and tone quality in accompanied and unaccompanied performances ($F[2, 77] = 735.83, p < .000$) (p. 90).

Based on the results, the authors suggested that subjects were able to listen effectively for multiple performance dimensions (Madsen & Geringer, 1999, p. 91). In a related study, Madsen, Geringer, and Heller (1993) found a significant difference between good and bad tone quality responses ($F[1, 78] = 353.83, p < .000$) but no differences between accompanied or unaccompanied excerpts (p. 97). It is important to note that, in the two studies, subjects' responses to accompanied and unaccompanied excerpts differed (Madsen et al., 1993, p. 98).

Participants were able to focus on multiple performance dimensions in Geringer and Madsen's (1995/1996) and Madsen and Geringer's (1999) studies. There may be factors that detract from a rater's focus. It is important to consider controlling for as many different variables as possible so that extraneous variables do not confound research results. Additional study of students' focus of attention with regard to visual and auditory stimuli during a musical performance is needed. Scholarly inquiry regarding how student listeners rate an entire performance is needed. Asking participants to focus on multiple dimensions of a performance may cause them to attend to microstructures within the music itself, rather than on the musical performance as a whole, confounding the data
Applying Clarke’s (2005) ecological theory of music listening, listeners may listen more for aesthetic value and the overall sound before listening for multiple dimensions or microstructures. Listening to an entire musical work, and asking students to rate the quality of the performance as a whole, shifts the focus of attention from microstructures to the overall performance. If students are asked to focus on the overall performance quality of a musical work, then other important questions may need to be considered. What students actually focus on when listening to music in the music appreciation classroom requires further inquiry. Moreover, it is unknown if the presentation mode has an effect on students’ perceived level of engagement and focus of attention when listening to music. Continued scholarly research is needed to address these issues.

**Cross-Modal Interactions Occur During Music Listening**

The use of visual stimuli paired with aural stimuli in musical performances may have an effect on listeners’ ratings of performance quality. Woody (2004), using an example of children watching a holiday parade, noted that people may rely on extra-musical stimuli to understand the expressive nature of what they have heard. Cross (2003) noted the importance of the multimodal nature of music because it may change throughout a musical performance (p. 81). “[The use] of music across cultures and historic times suggests that music is not a purely auditory phenomenon” (Livingstone & Thompson, 2006, p. 89). Researchers (Van Eijk, Kohlrausch, Juola, & van de Par, 2010; Vines, Krumhansl, Wanderley, & Levitin, 2006) have studied cross-modal effects of
visual stimuli on students’ perception, memory, and pitch recognition. Van Eijk, Kohlrausch, Juola, and van de Par (2010) found that auditory processing and visual processing may speed up when they are paired. Other researchers (Gonzalo & Büchel, 2003) have investigated cross-modal interactions in music listening including the relationship between brain function and visual stimuli using audio-visual music recordings.

Gonzalo and Büchel (2003) identified how cross-modal learning works. In their study of 12 healthy adult volunteers, Gonzalo and Büchel used functional magnetic resonance imaging (fMRI) to examine the responses of the visual and auditory cortices of the brain in the context of online learning of audio-visual associations. They found that subjects’ reaction time decreased significantly when reacting to visual and aural paired stimuli ($F[4, 16] = 8.3, p < 0.5$) versus non-paired stimuli ($F[4, 16] = 3.8, p < .05$) (p. 229). Based on their results, Gonzalo and Büchel suggested that the “sensory cortex plays a crucial role in cross-modal learning and suggests a high degree of functional specificity in relation to the type of material being learn[ed]” (p. 225). More specifically,

> the visual cortex becomes increasingly responsive to an auditory stimulus in the course of audio-visual learning...with respect to the visual and auditory modalities, it has been shown that regional cerebral blood flow in the occipital cortex in normal brains can be increased by auditory stimulation alone after having learnt that a sound predicts a visual event. (p. 226)

Therefore, individual neurobiological and physiological responses to music may influence a person’s response to different presentation modes in music education when cross-modal stimuli are present. Based on Gonzalo and Büchel’s (2003) results there is reason to believe that perceptions of an auditory experience are influenced by the cross-
modal interaction of both auditory and visual stimulation. If this is true, then the use of audio-only and audio-visual (recorded or live) listening experiences may have an effect on students’ perceptions of a listening event.

The perceptions of an auditory experience and the influences of cross-modal interaction of auditory and visual stimuli have been studied by several researchers including Vines, Krumhansl, Wanderley, Dalca, and Levitin (2011), and Chapados and Levitin (2008). Vines et al. (2011) explored the use of non-verbal communication using body movement and expressive sound to discover cognitive processes involved in integration emotion from multiple sensory modes with 30 musically-trained university subjects (p. 157). The researchers randomly assigned subjects to one of three treatment groups: audio-only, visual-only, and audio-visual. Subjects either listened only, saw only, or both heard and saw recorded performances by two professional clarinetists who played a musical work in three manners: restrained, standard, and exaggerated (Vines et al., 2011, p. 160). The standard performance manner was considered natural, “as if presenting to a public audience” (p. 160). After each performance, students were asked to rate 19 words associated with each performance on a Likert-type scale (p. 160). Quantitative data were analyzed using repeated-measures ANOVA with a between-subjects factor of presentation mode and within-subjects factors of performer, manner, and emotion. Researchers found the main effect for the factor of presentation mode was significant ($F[2, 27] = 4.77, p < .05$) (p. 160). Emotion ratings were significantly lower for the visual only group, with no differences between the audio-only and audio-visual groups. Emotional intensity through sound is greater than in visual only musical
performances (p. 160). The researchers suggested that familiarity with the audio-only and audio-visual conditions may have affected the results. Additionally, the main effect for manner ($F_{[2, 54]} = 12.70, p < .001$) was affected by significantly lower ratings for restrained versus standard or exaggerated performances (p. 161). The researchers suggested that the restrained movements in the performances negatively impacted the emotional intensity communicated to the listener/observer. The researchers concluded that “whether a subject could see a performance was the most important factor in determining how musicians’ expressive intentions would affect the emotions conveyed. The performers intended level of expressivity did not affect the emotions conveyed by sound alone” (p. 168). Therefore, the interaction of both the auditory and visual components of a musical performance contributes to the emotional communication between the performer and listener and may affect the listener’s perception of the quality of the performance.

In a different study, Chapados and Levitin (2008) found similar results to those of Vines et al. (2011). Chapados and Levitin examined cross-modal interactions between auditory and visual stimuli in the experiences of music listeners based on the assumption that “when a music performance is experienced through both auditory and visual channels, these two modes are likely to interact in order to give rise to the emotional experience” (p. 641). Participants included 12 musically trained female volunteers who were asked to watch three videos of professional male musicians performing an unfamiliar clarinet solo. Participants were randomly assigned to either an audio-only, visual only, or audio-visual condition and their electrodermal activity (EDA) was used as
a measure of arousal level (p. 642). Compared to baseline EDA's, the researchers found a significant difference in the mean EDA of the audio-visual condition ($t_{17} = 3.841, p < .01$). Based on the data, they suggested that the interaction between auditory and visual modalities conveyed through musical performances created a "holistic perception that was greater than the sum of its parts" (p. 646). Additionally, the authors noted that "it is important to recognize that all musical sounds, including singing, require movements of the body to produce them. That is, the origin of the auditory signal that we so closely associate with music is in a physical gesture that normally has a visual counterpart" (Chapados & Levitin, 2008, p. 646). Therefore, something that is musical is not just sound itself. What a person considers musical can include the visual component of a musical experience.

Both Vines et al. (2011) and Chapados and Levitin (2008) demonstrated that cross-modal interactions do take place when listening to musical performances. Although both studies compared audio-only, visual-only, and audio-visual music listening conditions, there was no live treatment condition. It is unknown if similar results would have been discovered for live presentation, which is also audio-visual, compared to the recorded presentations. Additionally, the performances included a soloist only, not an ensemble. Several important questions directly related to the purpose of the present study remain unanswered. If the presentation mode used during a music listening experience has an effect on a person's perception of the overall quality performance of what they have heard, especially if the presentation mode uses both auditory and visual stimuli is unknown. Moreover, if the ability to see and hear a performance has an effect on how
engaged a student feels with the music during a listening event requires further inquiry. Many of the studies about cross-modal interaction of aural and visual stimuli did not include watching an actual performance. Although it could be argued that watching a performance of an ensemble and examining visual aspects of the performance are two different experiences, the experience of listening to music in an audio-only listening condition also involves the possibility of looking at different stimuli. In an audio-only condition, the only visual component of the presentation is what is visible in the environment where the listening experience takes place. Additional research regarding how cross-modal interactions affect students' responses to music performances comparing recorded and live presentation modes, perception of engagement, age, previous training, and gender is needed.

In addition to the implications for music education and the study of music listening based on the results of the previous studies, the quantitative data and analysis collected in Vines et al.'s (2011) report did have implications for the methodology and data analysis of the present study. Although Vines et al. (2011) used repeated measures ANOVA to analyze their data, covariates—including age, gender, and musical training—were not examined. Repeated measures will be required to answer the research questions and achieve the purpose of the present study. Because of the repeated measures necessary for data collection and analysis, and existence of covariates, the use of a multivariate analysis of covariance (MANCOVA) to analyze quantitative data in the present study will be important to consider. Moreover, because most of the extant literature has been based on quantitative analysis it will be important to also collect qualitative data to
ascertain why listeners perceive music listening events as being of higher or lower quality and less or more engaging.

**Influences on Students' Ability to Assess Musical Performance**

Students' ability to assess different performance variables has been investigated by researchers in both music education and music psychology (Sloboda, 2005, p. 99). The assessment of musical performance is context dependent, and varies from the music classroom to a recital or festival performance (McPherson & Thompson, 1998). Bergee (1995, 2007) examined the ability of students to evaluate musical performances with mixed results positing that students do not have the expertise to validly assess high-level musical performances. Bergee (1995, 2007) used audio-only or audio-visual recordings and chose not to use a real world classroom or a live listening situation.

Bergee (2007) investigated performer, rater, occasion, and sequence of sources of variability in music performance assessment based on Generalizability Theory\(^1\), which allows the researcher to account for sources of measurement error and variance (p. 349). The performers included eight high school woodwind and brass instrumentalists that competed at a state solo and ensemble festival (p. 347). Bergee audio-recorded performers playing the first quarter of their solo three times the day after the state festival; there was no visual stimulus (p. 348). Each solo excerpt was individually scored by 10 raters—current or retired university faculty and two public school music educators.

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who had received state approved training for adjudicating woodwind and brass solo performances—and was randomly assigned to one of five performance sequences using a global scale of overall performance quality of zero to 100 (p. 348). After completing two generalizability studies, Bergee found that occasion and sequence did not have a significant effect on measurement error; however, the raters’ effects were responsible for a sizeable share of the error (p. 354). Based on the results, Bergee suggested there is a high possibility of measurement error among raters (p. 356).

In the work by Bergee (2007), raters were able to score only excerpts of a full work. They developed their own scoring criteria and scores were completely subjective. Moreover, the scores were not based on hearing an entire performance or on any visual stimulus. If a visual stimulus had been present, and if raters had heard the entire performance, it is plausible that the subjective ratings would have been different. Furthermore, in a real world listening experience, the listener or rater may have opportunities to make decisions about performance quality when an entire musical work is presented. Listening to an entire musical work in a classroom is a different context than a concert. The environment is different. Students in a music classroom may be of different ages, genders, and have very different music backgrounds and trainings. Additionally, the music listening experience can be presented using a variety of different presentation modes. In both live and audio-visual presentations, the music performance can be both seen and heard. The rating may be influenced by the context of the listening experience and attributed unique to each individual student even when taking place in large group listening context. Therefore, the effects of presentation mode and individual
student attributes such as age, gender, and musical training should be considered for music educators to understand the phenomenon of music listening in the music classroom. Further research is necessary if music educators are to understand this phenomenon and to inform music educator’s practice of teaching music listening skills.

**Multiple factors affect response to music.** Beyond notes, the effect of different factors on students’ ratings of a music performance is a topic of inquiry in music education and has important considerations for the present study. For example, in audio-visual (live and recorded) performances, students can both see and hear the musical performance simultaneously. Moreover, based on the results of analysis and research by Gonzalo and Büchel (2003), it is clear that cross-modal interaction may affect listeners’ responses to music, but what a person sees during a musical performance is not necessarily musical. Other factors may qualitatively affect the listener’s response to a musical event.

Several researchers have examined the effects of different factors on listeners’ responses to music. Howard (2012) investigated the effect of a variety of factors on 252 high school, undergraduate, and graduate students’ ratings of solo vocal performances that were presented using DVD recordings. Participants were asked to rate the overall performance quality of excerpts using a six-point Likert-type scale. Using a three-way analysis of variance, Howard found that ratings were significantly higher for soloists who wore formal versus casual attire ($F [1] = 5,723.12, p < .05, \eta^2_p = .954$) and demonstrated formal versus casual deportment ($F [1] = 5, 080.52, p < .05, \eta^2_p = .948$) (p. 175). Howard did not find a significant interaction between performers’ gender and adjudicators’
gender. Howard noted that the changes in presentation condition (audio-only versus audio-visual) did result in significant differences in performance ratings ($F[1] = 8,261.168, p < .05, \eta^2_p = .968$), with the highest ratings given when audio-only presentation was used. This finding was contradicted by Guerrini and Alexander (2012). In their study, the researchers found that participants rated audio-visual performances higher than audio-only condition ($p < .001$). The issue of condition is also contradictory to Wapnick, Campbell, Sidell-Strebel, and Darrow’s (2009) findings that audio-visual conditions were rated higher by adjudicators and that attractiveness of female pianists was a distinct advantage in performance ratings. Ryan, Wapnick, Lacaille, and Darrow (2006) examined the effects of physical characteristics of high-level performers on university student and faculty ratings of performance. Participants ($N = 227$) rated tone quality, note accuracy, rhythmic accuracy, expressiveness, style, and overall impression of audio-only or audio-visual recorded performances of 18 performers from the Van Cliburn Foundation piano competition using a seven-point Likert-type scale (Ryan et al., 2006, p. 563). The researchers found significant interactions regarding attractiveness and rater’s gender ($p < .02$). There were few significant interactions related to dress. The authors noted that audio-visual ratings were higher than audio-only ratings (Ryan et al., 2006, p. 565). Although the results of this study were similar to Wapnick et al. (2009), there were differences in the performer level (novice versus expert) and treatments. It may be difficult to compare or generalize results.

Based on Ryan et al.’s (2006), Wapnick et al.’s (2009), and Howard’s (2012) findings, many factors have an impact on students’ ratings of performance quality. The
effect may be different for students' ratings of solo vocalists and solo instrumentalists due to the use of different musical instruments. In addition, it is important to note that none of these researchers have considered students' ratings of an ensemble performance. The generalizability of the results of these studies is questionable due to the limits of each study, differences in instrument use, context, and performer level. If other factors have an effect on students' ratings of a musical performance, it is important to account for those factors when students engage in music listening. These factors may influence the presentation modes music educators choose to teach listening skills. Moreover, it would be helpful to understand which factors affect students' ratings of performance quality and engagement when different presentation modes are used. Therefore, it will be important to consider other factors beyond the music itself when coding qualitative data collected for the present study.

**Students' response to music varies by age.** Bundra (2006) noted that “to design meaningful listening experiences for the classroom, music educators need to draw on a body of research about…ways to improve listeners’ perceptions and reactions” (p. 12). If music educators are to heed Bundra’s (2006) advice, it will be important to understand how individual factors such as student age may affect student perceptions of and reactions to a musical work. Students in American public schools are often of relatively the same age when measured in years; however, in tertiary education and especially in community colleges, students are representative of a wide age range and are not grouped into classes simply based on their year in school (American Association of Community Colleges, 2012b). Although researchers have studied music listening in students of all
educational levels, at the tertiary level students are most often described as “undergraduate,” “graduate,” “university,” or “four-year university students” (Geringer et al., 1997; Lychner, 2008; Vines et al., 2011; Woody, 2006a). Other researchers have compared students of different ages, but typically in a public school setting describing students by either grade level specifically, or type of school they attend generally.

Killian (2001) found that presentation mode may influence the amount of musical information that students perceive when listening to a musical performance. Using a sample of fourth-graders, junior high students, high school students, and university students ($N = 180$), Killian (2001) reported a significant difference ($p < .001$) between the amount of musical information (comments related to musical aspects of performance) perceived in audio-visual and audio-only excerpts versus visual-only excerpts (p. 83). Elementary students made significantly more musical comments ($p < .05$) than any other age group during audio-visual music presentations (p. 84). Age was an important variable in Killian’s work; however, specific age was not measured. Only age groups, based on academic level (elementary, middle, high school, and university) were used. Although a specific grade-level of elementary students was examined, other academic levels were not grade-specific, removing any indication of age, particularly at the university level. Killian’s results may not be generalizable, especially to elementary students, because only one grade-level of students was used in her population. Killian referred to academic level and not age specifically. Killian’s results may not be generalizable to any one educational level because multiple ages of students are present in elementary, junior high, high school, and university music programs.
Unlike Killian (2001), Kerchner (2000) examined the verbal, kinesthetic, and visual responses during a music listening experience of students in two different elementary school grades using a qualitative research design. Working with a sample of twelve second- and fifth-graders (six in each grade), Kerchner examined the participants’ cognitive processes manifested in verbal, visual, and kinesthetic responses that resulted from the repeated listening of an excerpt of Bach’s Brandenburg Concerto No. 2 in F (p. 31). During the first two listening experiences, participants gave verbal responses to what they listened to and during the third listening, participants drew a visual representation (listening map) of their experience (p. 35). During the final listening experience, participants were asked to provide kinesthetic descriptions that were videotaped and then later used for the student to describe their reaction to what they were listening to (p. 35). Kerchner found that the fifth-grade students used higher-level cognitive processes to describe different musical information. Additionally, fifth-grade students provided more affective responses based on aesthetic value or interest (p. 47). After analyzing the students’ responses, Kerchner concluded that “children should have the opportunity to express their musical perceptions and responses through multiple modes of response and representations in the music classroom” (p. 48). Additionally, Kerchner concluded that children compare new experiences with prior experiences. Kerchner’s findings have important implications for the present study. Kerchner only used an auditory stimulus in the study. If students respond in a variety of ways to music, it is also possible that the way the presentation mode used to communicate the music may have an effect on the student’s response. Furthermore, if older students use more sophisticated cognitive
processes when responding to a music stimulus, then a student's age and prior musical experiences could affect their perceptions of a musical work during music listening activities. The effect that student age has on the perception of the quality of a performance of a musical work and their perceived level of engagement when listening to music requires further inquiry.

**Gender.** Gender has been an important topic in both music education and feminist theory. McClary (1991) stated that

> music is able to contribute heavily...to the shaping of individual identities: along with other influential media such as film, music teaches us how to experience our own emotions, our own desires, and even...our own bodies. For better or for worse, it socializes us. (p. 53)

A person's social life is full of both auditory and visual stimuli, communicated in combination, and internalized beginning in infancy (Sawyer, 2005). If this is true, then it is not just the music itself, but all that is involved in the musical experience—music making, listening, and seeing—that shape our identity and our socialization within our culture. From a feminist theory perspective, the socialization of students in relation to what they see and hear may be problematic. The terms "listener" and "student," in music education, have both historical significance and feminine and masculine associations (McCarthy, 1999; McClary, 1991).

A plethora of researchers have posited that music directly evokes emotions and affects emotional states (Elliott, 2005; Finnäs, 1987, 2006; Gruhn & Rauscher, 2006; Juslin & Laukka, 2003; Juslin & Västfjäll, 2008; Levitin, 2006, 2008; Lindström et al., 2003; Sloboda & Juslin, 2010). Whether or not music evokes any gender associations is unclear. In contrast, Gould (2011) noted that, in the United States and Canada, "state and
provincial governments have implemented music curricula organized around specific content and achievement standards that do not account for student difference or specific educational needs" (p. 131). If music educators are to understand how students respond and react to music that is presented to them—one of the tenets of music listening in music education and of music psychology—then it will be important to understand how gender affects the perception of music presented in live, audio-only, or audio-visual presentation modes. Although some researchers have found no gender differences in response to music using different presentation modes (Dunn, 2008), other researchers have noted some gender differences in response to listening activities. One other important consideration when attempting to understand gender differences in music listening is if results are truly a result of gender differences or a result of sociocultural norms (Egermann & McAdams, 2013). If gender differences do exist, then understanding what the difference is and why they exist requires further exploration.

In Killian's (1990) study of model characteristics and music preference, she found significant differences in participants' preferences for a performer related to both the participants' and musicians' genders (p. 120). She found significant differences between males and females ($\chi^2 [1, 179] = 64.51, p < .001$) in preference for male over female soloists (p. 120). Across racial groups, there were significant differences in musician gender preference for female participants ($\chi^2 [2, 112] = 9.94, p < .01$) (p. 120). The majority of participants preferred musician soloists of the same gender as themselves. This finding is important because the gender of the performer may impact students' ratings of the quality of performance. Gender may have less of an effect if students
listening to the performance cannot see it. If students are responding to audio-visual performances where they can both see and hear the performance at the same time, the gender of the student may affect their perception of performance quality if the performing ensemble is of a single gender or includes soloists. Therefore, it is important to ask ourselves as music educators, when teaching both genders of students, if gender has any effect on students’ perceptions about a music performance or during the music listening experience. It would be useful to know if gender has an effect on students’ perception of a performance if the ensemble is of mixed gender and does not highlight any soloists.

**Summary**

After reviewing relevant literature, there are clear gaps that the present study will fill with potentially important implications for music education. The use of different presentation modes affects students’ perception of the quality of a musical performance. Although students may have a variety of different affective and cognitive responses when engaged in music listening, the responses are subjective and individual to the student. There are multiple individual variables that may affect a student’s affective and cognitive responses when listening to music including age, gender, and previous musical training.

There are a variety of different presentation modes that may be used to present music listening experiences in either a traditional lecture course or a musical performance ensemble. The use of one presentation mode over another may affect students’ perceptions of the listening experience in the music education classroom. Live audio-only, live audio-visual, audio-only recording, and audio-visual recording presentation modes are all possible methods for presenting a musical performance to students.
Researchers have not compared the effect of different live and technologically created performance modes on students' perception and ratings of the overall quality of a musical performance. In addition, researchers have examined students' perception of a musical performance related to solo vocalists, solo instrumentalists, instrumental ensembles, and popular music ensembles. None have examined students' perceptions of a choral performance.

Researchers suggest that cross-modal interactions may take place when both auditory and visual stimuli are present when a person is engaged in music listening. Although researchers suggest that visual stimuli affect overall ratings of music performance, extraneous visual variables may have confounded the results. Extraneous variables include the listening context, classroom versus laboratory environment, ensemble dress and deportment, performer gender, age, and expertise. The effect of visual stimuli may be situational. Furthermore, variables, such as age, have confounded the results of a large portion of the research. A student's age may affect their perception of the quality of a music performance because of their degree of familiarity with different presentation modes. Although education level and perceptions of musical performance have been studied, the majority of researchers have focused on students at a four-year university or students in K–12 public education. Community college students have not been a population considered in any studies about music listening or perception. Age and education level vary greatly at community colleges (American Association of Community Colleges, 2012a). The variation in music education backgrounds of community college students affects music listening and music education pedagogy in
community colleges.

Continued scholarly inquiry into the effect of presentation mode on students’ perception of the overall quality of music performance is warranted. In this study, I have examined community college students, a previously unstudied population. Within this group, variables such as age, gender, and previous music education will be delineated, providing an atypically in-depth look at these variables. Many researchers have used only quantitative measures for analyzing data; however, few if any have controlled for multiple variables or used a mixed-methods research design. For the current study, quantitative measures were used to study the effects of age, gender, and previous musical training on overall ratings of performance quality. Qualitative data were collected to further understand the participants’ reasons for their ratings providing a more in-depth view and description of the phenomenon being studied.
CHAPTER 3

Methodology

The purpose of this study was to examine the effect of presentation mode on community college students' ratings of the quality of a choral performance, and self-perceived level of engagement with the music controlling for age, gender, and previous musical training. I developed the following research questions based on the purpose of the study:

1. What effect, if any, does presentation mode have on participants' ratings of the quality of a choral performance?
2. What effect, if any, does participants' age, gender, or previous musical training have on participants' ratings of the quality of a choral performance?
3. What effect, if any, does presentation mode have on participants' ratings of their engagement with the music during a choral performance?
4. What effect, if any, does participants' age, gender, or previous musical training have on participants' ratings of their engagement with the music during a choral performance?
5. Why do participants rate the quality of a choral performance of one presentation mode higher than others, if at all?
6. Why do different presentation modes make participants feel more or less engaged with the music, if at all?

Understanding the effects of presentation mode, age, gender, and previous musical training on community college students' perception of the quality of a choral
performance may help music educators improve instruction in both critical and analytical 
listening. Additionally, understanding the effects of presentation mode on students’ 
perceived engagement with the music during a listening activity may help music 
educators to tailor music listening activities to the millennial generation of tertiary 
students and fostering increased appreciation. To understand the phenomenon of music 
listening in the music appreciation classroom, it was necessary to collect both 
quantitative and qualitative data.

The collection and analysis of quantitative data helped me understand the main 
effects and interaction effects of presentation mode, age, gender, and previous musical 
training on participants’ quality ratings of and perceived level of engagement during a 
listening experience. Phelps, Sadoff, Warburton, and Ferrara (2005) noted that 
quantitative research methods are based on the use of measurement, statistical principles 
and models to verify the phenomenon being studied” (p. 186). It was also important to 
collect qualitative data to better understand participants’ reasoning for their ratings. To 
understand all of the effects and student perceptions, a non-experimental, mixed-
methods, descriptive design was used because the collection of several types of data 
helped me to have an in-depth understanding of the problem being studied (Creswell, 
2003, p. 21).

**Research Design**

In this study, the effects of presentation mode, age, gender, and training on 
community college students’ perceptions of performance quality of a choral performance 
were investigated using live, audio-only, and audio-visually recorded formats. A mixed-
methods research design was used because both quantitative and qualitative data needed
to be collected to describe how presentation mode affects participants’ perceptions of a
choral performance. Asmus and Radocy (2006) stated that quantitative methods provide
researchers with a way to “combine and manipulate numbers in a myriad of ways to gain
insights and reach conclusions regarding their problems, questions, and hypotheses” (p. 95). Phelps et al. (2005) noted that “qualitative researchers remain open to what a
particular action or set of actions under study might mean...the focus of that desired
understanding is to reveal participants’ perceptions and views” (p. 79).

For the design for this study I used a non-experimental, concurrent procedures
studies as those for which the researcher “collects both forms of data at the same time
during the study and then integrates the information in the interpretation of the overall
results” (p. 16). The purpose of collecting quantitative data is to examine if possible
cause-and-effect relationships exist between multiple independent and dependent
variables (Gall et al., 2007, p. 306). Investigation of cause-and-effect relationships related
to presentation modes has been completed by several researchers (Ebie, 2004; Geringer et
Madsen & Geringer, 1999; May 1985; Rose & Wagner, 1995). In addition, several
qualitative questions were asked to better understand participants’ responses (ratings)
during data collection and provide a richer description of the phenomenon taking place.
The use of qualitative research designs has also been common among researchers (Dunn,
2006, 2008; Kerchner, 2000). Based on a review of extant research, there has been little
work done using mixed-methods to explain the effects of presentation mode on students’ perceptions of performance quality and engagement.

Four independent variables (causes) were used including: presentation mode, age, gender, and previous musical training. Presentation mode varied by: (a) live audio-visual, (b) recorded audio-only, and (c) recorded audio-visual. The independent variable of presentation mode is a nominal measure because the categories are “mutually exclusive and collectively exhaustive” (Miethe & Gauthier, 2008, p. 39). Although each category of presentation mode may be assigned a number for the purpose of analysis, the numbers “designate that the categories are different in type or kind, not that one category is smaller or larger than another. The ideas of distance, order and/or magnitude are not relevant in nominal measures of attributes” (p. 40).

Community college music classes may include students of a variety of ages (Brawer, 1999; Committee on Music in Junior Colleges, 1970). Age is likely to be significant because of exposure to changes in technology and availability of performance mediums. Students of different ages may have been familiar with different music presentation modes. Also, familiarity with different music presentation modes can change in a short amount of time (Finnás, 2001).

Age was a nominal (categorical) measurement (Miethe & Gauthier, 2008, p. 316) using groupings based on the monitoring of student age by the Oregon Department of Community Colleges and Workforce Development (2011a). The groupings included ages 18-24, 25-44, 45-64, and 65 years old or older. There are several reasons for the use of these categories by the State of Oregon. First, many students in or recently graduated
from high school attend community colleges and their college funding is paid by their high school for one to two years as part of a state mandate for students to receive college credit while “in” high school (Greater Albany Public School District, 2013). Second, these age groups are also the ages used to track community college students both by the State of Oregon (Oregon Department of Community Colleges and Workforce Development, 2011a) and nationally (American Association of Community Colleges, 2012b). Using the age ranges above was consistent with current data about community college students in the State of Oregon.

Gender is a nominal variable and included the same options outlined and listed by the American Association of Community Colleges (2012b). The gender categories were male and female. Musical training was measured on an ordinal scale of low (0-4 years), middle (5-9 years), and high (10 or more years).

The dependent variables (effects) were the participants’ ratings of overall quality of the performance of the musical work and perceived engagement with the music for each presentation mode. Quality of performance and level of engagement were rated on a four-point Likert-type scale for each choral performance using each of the three presentation modes. For quality of performance, a rating of 4 was considered excellent performance quality and a score of 1 was considered poor. For level of engagement, a rating of 4 was considered extremely engaged and a score of 1 was considered not engaged at all.
Population

The population of inquiry was students enrolled in community college music appreciation courses in the Mid-Willamette Valley of the State of Oregon in the Pacific Northwest region of the United States. The Pacific Northwest region is defined as the states of Oregon and Washington bordering the northern Pacific Ocean of the United States, north of California and south of the Canadian border (Pacific Northwest, 2012). The Mid-Willamette Valley of the State of Oregon is defined as the area between Eugene, Oregon to the south up to Salem, Oregon in the North (Willamette Valley, 2013). At the time this study was conducted, there were three community colleges within the Mid-Willamette Valley classified as large community colleges by the Oregon Department of Community College’s and Workforce Development (2011b). Large community colleges in the State of Oregon are those community colleges having more than 20,000 students. Music appreciation classes at two of the colleges participated in the study.

Participant Selection

Participant selection began once permission to proceed with the study was granted from the Institutional Review Board (IRB) at Boston University (see Appendix E). Participant selection was limited to community college students in the Mid-Willamette Valley of the State of Oregon who were enrolled in a music appreciation course at the time of data collection. Of the three community colleges in the Mid-Willamette Valley of Oregon, all offer music appreciation courses during the academic school year (Oregon Department of Community Colleges and Workforce Development, 2010, 2011a, 2011b).
Participant selection was limited to only two of the community colleges (four classes) due to the cancellation of one of the courses shortly before data collection began.

**Sampling**

Each of the community colleges with music appreciation classes in the Mid-Willamette Valley in Oregon was invited to participate in the study. Initially, four classes at three colleges were scheduled. At the time data collection took place, one college had cancelled the course and another had added a section of the course. Therefore, four music appreciation classes at two colleges were invited to participate. I contacted the instructor for each class, asked each instructor for permission to visit their classes, explain the study to possible participants, gain consent from participants, and conduct data collection. The sample recruited for participation was not enrolled in a course I was teaching. I used a criterion sampling strategy (Miles & Huberman, 1994, p. 28 in Creswell, 2007, p. 127). A criterion sampling strategy means that members of the sample must meet some defined set of criteria (Miles & Huberman, 1994, p. 28 in Creswell, 2007, p. 127).

After examining Oregon community college websites and class schedules, I discovered that the average music appreciation class size was 32 students, with a range of 30 to 38, when classes were filled to capacity and often included multiple sections of the same course (Chemeketa Community College, 2012; Lane Community College, 2012; Linn-Benton Community College, 2012). The total enrollment of students during the term of the school year when data was collected was 80. In Orcher's (2005) "Table of Recommended Sample Sizes (n) for Populations (N) with Finite Sizes," the recommended sample size for a population of 80 students is 66 (p. 240). Having all four
classes offered at the two community colleges with music appreciation classes participate would achieve a sample size large enough to maintain population validity in the study and allow for the possibility that some students may not choose to participate.

In November 2013, the fall quarter for Oregon community colleges, I visited each of the music appreciation classes during the seventh week of the quarter at the two participating community colleges upon initial consent from the instructor. Although there were four classes, there were three data collection sites. The first site was a music appreciation class on the main campus of Linn-Benton Community College (n = 19). The second site was a music appreciation class at the Benton Center of Linn-Benton Community College (n = 22). The third site was a combination of two music appreciation classes at Lane Community College (n = 30) (see Table 1). I visited one site per day for three days. At each site, I explained the purpose of the study, provided a copy of the recruitment script to potential participants, and obtained their consent to participate. Potential participants who were minors (under age 18) were excluded from participation because they were not able to consent. Participants were informed that their participation was voluntary and that they could discontinue their participation at any time. Data were collected immediately after consent was obtained. Both participants and non-participants received cookies and juice as a thank you. There were no consequences for non-participants who chose not to participate in the study.
Table 1

Participants by Variable of Interest

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-24</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>25-44</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>2</td>
</tr>
<tr>
<td>Years of Musical Training</td>
<td>Low (0-4)</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Middle (5-9)</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>High (10+)</td>
<td>21</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>35</td>
</tr>
</tbody>
</table>

N = 71; More detailed information about participants will be presented in Chapter 4.

Data Collection Sites

Data were collected at three different data collection sites on three campuses of two community colleges in the Mid-Willamette Valley in the State of Oregon.

Location One. The first data collection site was the music classroom on the campus of Linn-Benton Community College in Albany, Oregon. The classroom is a general use music lecture and performance classroom. Students entered the classroom through a pair of glass doors and took their seats on black chairs on seated risers. Because the room is shared with a variety of different classes and used for multiple purposes, there are no desks in the classroom. A standard multimedia cart common to all classrooms on campus was in the room, which included a cassette player, computer, DVD/VHS combination player, and amplifier with two speakers on the center of the back wall.
Additionally, a screen was on the back wall directly in front of the participants with a projector hanging down from the ceiling to project the audio-visual presentation. The live choir waited in their performance uniforms seated quietly and out of the way of the participants.

**Location Two.** The second data collection site was a classroom on at the Benton Center, a satellite campus of Linn-Benton Community College located in Corvallis, Oregon. The classroom was a large, sterile classroom on the second floor of the center. In the classroom, the students could enter from a door on either side of the classroom. It was a long room filled with tables and chairs with no desks. Students were seated at the tables in rows on either side of the classroom with a main aisle down the middle. In the front of the classroom there was a whiteboard, two speakers, and a screen. A projector was hanging from the ceiling mounted to project any visual presentations played on a standard multimedia cart exactly the same as described at data collection site one. The live choir waited in the back of the classroom until their portion of the data collection process took place.

**Location Three.** The third data collection site was a music lecture classroom in the basement of the Fine Arts building of Lane Community College in Eugene, Oregon. Due to the small number of participants enrolled in one of the music appreciation classes, two instructors combined their classes to meet in the room on the day of data collection. Three of the four walls of the room were covered with whiteboards containing music staves. In the front of the room was a piano, a lecture podium and a multimedia cabinet. Inside of the multimedia cabinet were a DVD/VHS combination player, cassette player,
amplifier, and computer. Two speakers were mounted on the wall in the front of the classroom. A screen for multimedia visual presentations was mounted at an angle on the front left corner of the classroom. The classroom was smaller than the classrooms at the other two data collection sites. Students sat in chairs at smaller tables in three sections with two aisles in the classroom. The live choir waited in their performance uniforms in the back of the classroom until their portion of the data collection process took place.

Procedures

**Preparation of materials.** After permission from the IRB was granted (see Appendix E), I obtained consent for participation from a convenience sample of choir members from the community college where I currently teach. The choir members served as the performance ensemble for the study and were not a part of the population being studied. The choir of mixed voices performed three *a cappella* choral works from the same time period of music history. The works performed were three Renaissance Madrigals in English including: “Now is the Month of Maying” (Thomas Morley), “Come Again, Sweet Love Doth Now Invite” (John Dowland), and “Pastime with Good Company” (Henry VIII).

The use of three *a cappella* choral works for this study was intentional. Although participants were probably familiar with both choral and instrumental music, choral music ensembles were the only ensemble commonly offered as part of the music programs at each of the data collection sites. Moreover, based on the syllabi of the music appreciation courses at each data collection site, English madrigals from the Renaissance period were a part of the program of study and data collection was timed to coincide with
when students were learning about the genre in their courses. Additionally, because only choral music is the only music ensemble experience offered where I currently teach, it was convenient and practical to use choral examples, especially due to the necessity to prepare and travel with a live choir to each data collection site. The preference for or familiarity with the *a cappella* choral work itself was not a topic of inquiry; however, if participants are used to listening to the same work multiple times in a short time period, some bias may be formed. Furthermore, the purpose of the study was to examine the effect that presentation mode and characteristics unique to individual participants has on the participants’ perception of the overall quality of and engagement with the music during the performance, not to evaluate the traits of the choral performance itself. Using different choral works for all conditions eliminated comparisons between performances of different choral genres and use a musical genre often included in music appreciation courses (Yudkin, 2011). “It is clear that the same event, be it musical or otherwise, does not always result in the same emotional experience” (Sloboda, 2005, p. 208). Sloboda (2005) gave the example of listening to the same recording on different occasions and feeling differently about it each time he heard it. Although the musical events were the same for all students, changing the presentation mode may have an effect on the students’ listening experience and affect the rating of the overall quality and their perceived engagement with the music while listening. The use of *a cappella* works removed the issue of accompaniment or other changes that would confound data collection and results.

After the choir prepared the choral works, a master audio-only recording of the first choral work was created using a TASCAM dr-40 4-track audio recorder and
microphone connected with XLR to quarter-inch connections. A master audio-visual recording of the second choral work was made using a Canon Mini-DV Camcorder. The recording was not edited or altered in any way except to transfer the audio-only to a compact disc. After the choir was prepared and the audio-only and audio-visual recordings were completed, data collection was able to take place.

**Instrumentation.** After the recordings were prepared, the data collection instrument was developed. The data collection instrument was a two-page, double-sided data collection form that I designed (see Appendix A). The front page contained information about the purpose of the study, anonymity of each participant, confidentiality of responses, and directions that were read aloud to the participants. The front page of the form was used to collect demographic data, including participants’ age, gender, and years of musical training. Demographic data was on the opposite side of the page from the participants’ ratings so that the researcher did not form opinions or bias during the data entry and analysis process.

Participants were asked to assign a rating of the overall quality of the performance of an *a cappella* choral work on the back side of the data collection form. The first performance was identified as “audio-only” and participants were asked to rate the quality of the overall performance using a four-point Likert-type scale. A four-point Likert-type scale was used to eliminate a neutral or “middle” level rating. Qualifiers to identify the range of the ratings were placed on one (poor) and four (excellent), but no other descriptors were placed on the form. Participants were asked to circle only one rating. Additionally, participants were asked to rate their perceived engagement with the
music during the listening experience using a four-point Likert-type scale. Qualifiers to identify the range of the ratings were placed on one (little) and four (very), but no other descriptors were placed on the form. Following each rating, participants were asked to write a brief explanation of their ratings. The same procedure was followed for each of the other two listening conditions, with one condition per side of the page. After the data collection was completed, the forms were collected for data analysis.

**Data Collection.** I traveled to the three sites previously discussed for data collection (see Figure 3). The researcher excused those students who did not consent to participate in the study prior to data collection taking place. At each site, participants first listened to and then rated the overall quality of and engagement with the performance of “Now is the Month of Maying” using an audio-only presentation mode on a four-point Likert-type scale.

After listening to the audio-only recording of “Now is the Month of Maying”, each group listened to the other two works. For the second listening experience, participants listened to “Come Again, Sweet Love Doth Now Invite” using an audio-visually recorded presentation mode, and “Pastime with Good Company” using a live presentation mode for the third listening experience. Participants listened to the same pieces in the same order. For the live presentation mode the same choir that completed the recordings was used, performing the work as they would in a choral performance. The live and audio-visual recording presentation modes contained both auditory and visual components as part of the performances.
Participants will complete the demographic data portion of the data collection tool

<table>
<thead>
<tr>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants listen to an audio-only recording of “Now is the Month of Maying”</td>
<td>Participants rate the overall quality and perceived level of engagement with the music using a four-point Likert scale</td>
<td>Participants provide written responses explaining their ratings of quality and engagement</td>
</tr>
<tr>
<td>Participants experience an audio-visual recording of “Come Again, Sweet Love Doth Now Invite”</td>
<td>Participants rate the overall quality and perceived level of engagement with the music using a four-point Likert scale</td>
<td>Participants provide written responses explaining their ratings of quality and engagement</td>
</tr>
<tr>
<td>Participants experience a live performance of “Pastime with Good Company”</td>
<td>Participants rate the overall quality and perceived level of engagement with the music using a four-point Likert scale</td>
<td>Participants provide written responses explaining their ratings of quality and engagement</td>
</tr>
</tbody>
</table>

**Figure 3.** Procedural model of what participants will do during data collection.

There are several reasons that participants listened to all three *a cappella* choral works, while using all three presentation modes, in a single data collection session. First, the amount of time each class met varied by college and there may not have been enough time for participants to complete the data collection process. If time constraints interfered with the data collection process, time would be a confounding variable. The collection of quantitative data took no more than 45-minutes, well under the normal hour class meeting period (Lane Community College, 2012; Linn-Benton Community College, 2012). Second, in this study the researcher only collected data once to eliminate history and maturation as extraneous variables. If participants were to be exposed to the same *a cappella* works over a period of time, their familiarity with the works may have biased their perception of the performance. Maturation could have been an extraneous variable if
completion of the data collection required multiple visits to each class because participants might have received additional instruction in listening that may have confounded the data. Additionally, the same choir was used for the recordings and live presentation so that the choral performances being experienced by participants were by the same choir of the same ability level throughout. The use of different ensembles for listening examples may have created an unintended bias or introduce an extraneous variable not examined in the current study. It was important to complete data collection within the same timeframe at all sites.

Participants were asked to complete the first page of a researcher designed data collection form to collect demographic data including age, gender, and previous musical training (see Appendix A). After the first page was completed, I asked the participants to turn the page over to complete the data collection for the audio-only listening experience (see Figure 3). After this was completed, I asked participants to turn to the third page of the data collection instrument to complete data collection for the audio-visual listening experience. The same procedure was used to collect data for the third presentation mode, live performance.

For each presentation, I read the directions aloud to the participants. After directions were read, and participants were given the opportunity to ask any clarifying questions, participants were asked to listen to the audio-only recording performance of “Now is the Month of Maying” and to rate the overall quality of the performance. Following the first listening task, participants were read the directions for the second and third listening tasks and told the presentation mode (condition) that was going to be used.
Participants followed the same procedure for both the second and third conditions. After participants completed all of the information for the second condition, the procedure was repeated for the final listening condition.

After listening to a piece in each of the three listening conditions, participants were asked to give qualitative responses after rating the performance quality and engagement with the music for each presentation. Qualitative questions followed all of the rating questions on the data collection instrument and participants explained their ratings of performance quality and their level of engagement in their own terms. The qualitative data collected were used to develop a deeper understanding and meaning of the phenomenon taking place based on participants' responses. In addition to participant responses, I also completed observations of the participants and the environment during the data collection process to also help me to understand the phenomenon. I used a reactive observation procedure (Gall et al., 2007, p. 266) and made handwritten notes on a paper tablet during the data collection process. I recorded my observations to recall my own thoughts, questions, and reflections of what was occurring during the data collection process and compare my observations with the comments written by the participants.

After participants finished completing the data collection forms, the forms were collected and placed into an envelope and sealed until data analysis began. I thanked the participants and non-participants, and provided them with juice and cookies.

Data Analysis

Data was analyzed using IBM SPSS (version 21) software. Measures of central tendency (mean, median and mode) were computed for each dependent variable and used
to describe participants' ratings of the a cappella choral performances for each presentation mode. The purpose of computing the measures of central tendency for each dependent variable was to form a baseline comparison of what the average student rating was for performance quality and perceived level of engagement with the music for each presentation mode. These measures were used to help the researcher understand how the independent variables of age, gender, and previous musical training affected participant ratings of quality, and self-perceived level of engagement and to investigate the assumptions needed for multivariate analysis.

To answer research questions one through four, a three-way repeated measures multivariate analysis of covariance (MANCOVA) was completed. The purpose of this procedure was to examine how dependent variables varied over time, using multiple measurements of that variable with each measurement separated by a given period of time (Stevens, 2009). For this study, the time period was short and based on the idea that multiple presentation modes may often be used in a single hour-long music appreciation class. There were multiple dependent and independent variables. Therefore, it was necessary to complete a three-way, repeated measure MANCOVA because all participants rated quality and engagement for all three presentation modes. “In MANCOVA we are assuming there is a significant relationship between the set of dependent variables and the set of covariates” (Stevens, 2009, p. 354).

The dependent variables in this study were participant ratings of quality of each choral performance and ratings of self-perceived engagement with the music. The independent variables were the three presentation modes (audio-only, audio-visual, and
live), age, and years of previous musical training. Gender was analyzed as a covariate because the participants were “classified on several independent variables (called factors)...to determine whether each factor and the interactions between the factors have a statistically significant effect on the dependent variable, after controlling for the extraneous variable” (Gall et al., 2007, p. 632). Although some participants’ age may have been the same, their years of previous musical training varied, which may have had an effect on whether presentation mode has an outcome on the dependent variables (Gall et al., 2007, p. 640). Therefore, gender was chosen to be a covariate. To answer questions 1 and 2, the within-subjects variable was the ratings of each performance and the between-subjects variables were presentation mode, age, and years of musical training with gender being a covariate. To answer questions 3 and 4, the within-subjects variable was ratings of self-perceived level of engagement for each performance, and the between-subjects variables were presentation mode, age, and years of musical training with gender being a covariate. When analyzing the data in SPSS, it was important to consider which variables had main effects on the dependent variables (Stevens, 2009). It was also important to examine the interaction of each main effect on the different dependent variables and the covariate with the main effects and dependent variables (Stevens, 2009). If there was any interaction between the covariate with the main effects and dependent variables, the interaction may help to explain possible predictions on what individual factors influenced the main effects on the dependent variable (Stevens, 2009).

To answer questions five and six, qualitative data were analyzed to further understand why participants assigned certain quality ratings and ratings of self-perceived
level of engagement to each performance and condition. The purpose of collecting qualitative data in addition to the quantitative data was to understand typical and extreme cases and how participants’ reasoning may help to further understand and provide meaning to the data collected. Additionally, Clarke (2005) and Hargreaves et al. (2012) suggested that listening is a personal activity, and the meaning from listening experiences is an individually constructed part of a participant’s reality; therefore, it is important to understand how participants’ responses are constructed and are meaningful to them.

Qualitative data included written responses (documents) by participants explaining each rating on the data collection instrument and my own written observations. The written responses were coded using QDA Miner Lite (Provallis Research, 2012, version 1.0.2) to identify themes in the data. I also analyzed my own observations and compared them with the results of the qualitative analysis to better understand what happened. The themes identified in the data were used to provide additional analysis and meaning of the data obtained. Validity of qualitative data is a concern in the data analysis (Phillips, 2008, p. 88). I analyzed any extreme cases acknowledging and discussing anything that does not “fit” (Phillips, 2008, p. 88). After qualitative data were coded and analyzed, a draft of the analysis was provided to a focus group of participants to “review the statements in the report for accuracy and completeness” (Gall et al., 2007, p. 475).

**Member Checking**

After all of the qualitative data were analyzed, coded, and major themes identified, a member checking focus group meeting was conducted to corroborate my analysis.
The member checking focus group met three weeks after the data collection process was completed to allow me time to analyze and code the qualitative data. The members of the member check focus group consisted of five volunteer participants that completed volunteer cards at the end of data collection at each site. The members of the focus group were from all three data collection sites and were selected based on their availability to meet at a common time on a common day. On the volunteer cards, members provided only their first names, a phone number, and email address to contact them to arrange the meeting. After the meeting was confirmed with members, the information cards and emails were destroyed to protect the anonymity of the members. Members were not given any information about the data collection, analysis, coding, or themes prior to the member checking process. The member checking meeting was audio-recorded on a cassette player and member responses were transcribed to corroborate or add to the data analysis.

The member check meeting lasted three-hours and took place in a classroom on the campus of Linn-Benton Community College in Albany, Oregon. Members were identified only by a letter and asked not to provide or state any identifying information about their selves during the meeting so that responses were as anonymous as possible. Members were identified as A, B, C, D, and E.

At the beginning of the member check meeting I thanked each of the members for participating in the process. For this process, I provided members with a copy of the transcripts of all participants’ responses regarding the quality of each choral presentation. I also provided participants with a copy of my code list for quality. After members
reviewed the data transcripts, codes, and themes we discussed their thoughts about what they read. After the members completed their review of the qualitative data about the quality of each performance, they repeated the same review process regarding participants' comments about their perceived level of engagement with each musical performance. The results of the member checking process are presented in Chapter 5.
CHAPTER 4

Presentation of Quantitative Results

The data for this study were collected using both quantitative and qualitative methods. The quantitative results are reported in this chapter followed by the qualitative results in Chapter 5. The results are reported separately for a clear analysis of each set of data collected.

Quantitative Data Analysis

Quantitative data for this study included participants' ratings of perceived quality of an *a cappella* choral performance and perceived level of engagement with the music during three listening experiences each with a different presentation mode. Participants were asked to circle the number corresponding to the perceived level of quality and engagement using a four-point Likert-type scale. Data were then entered into SPSS statistical analysis software and a three-way repeated-measure Multivariate Analysis of Covariance (MANCOVA) was computed for data analysis.

Throughout the chapter, I present the results as they pertain to each quantitative research question (Questions 1 through 4). Research questions 1 and 2 are questions about participants' quality ratings. Research questions 3 and 4 are questions about participants' perceived level of engagement with the music. Because of the large amount of data presented and discussed in this chapter, I have presented the results in smaller stages.

I begin the presentation of the quantitative results with information and descriptive statistics about the participants in the student in general, and differences in
Following general descriptive information about the participants, I present the results as they pertain to each research question. For each research question, I provide analysis of descriptive statistics for each presentation mode. Following analysis of the descriptive statistics, I provide analysis of a three-way repeated measure MANCOVA. Included with each analysis are results of multivariate tests, test of within-subjects effects, between-subjects effects, and pairwise comparisons.

**Participants**

Of the 80 students enrolled in a community-college music appreciation course in the Mid-Willamette Valley of Oregon at the time the data were collected, 71 participated in the data collection process for this study. Two potential participants were excluded because they were minors and were not part of the population to be studied. Seven other potential participants were not present in their regularly scheduled class on the days that data were collected. Therefore, 89% of the population being studied participated in the data collection process. Orcher (2005) indicated on the “Table of Recommended Sample Sizes (n) for Populations (N) with Finite Sizes” that a sample size of 66 is recommended for a population of 80 (p. 240). The number of participants (n = 71) compared to the population size (N = 80) was large enough and within acceptable parameters.

**Gender.** There were 36 male (50.71%) participants and 35 female (49.29%) participants. The number of male and female participants was relatively equal.

**Age.** Participants were asked to circle the age range that they currently identify with based on their own age. The age ranges provided to participants to choose from were
based on those used for data collection and reporting by the American Association of Community College (2013). Out of the sample of 71 participants, 55 (77.46%) identified as being between the ages of 18 and 24, 14 (19.72%) identified as being between the ages of 25 and 44, and 2 (2.82%) identified as being between the ages of 45 and 64.

Years of musical training. Participants were asked to indicate whether they had low, middle, or high amounts of previous musical training. I defined musical training as any purposeful and intentional music education that the participant experienced up to the day of data collection. The years of musical training were determined by each participant individually and could include music training from early childhood. One of the purposes of music in childhood is to “build a foundation of musical skills and concepts children can carry through their lives (Campbell & Scott-Kassner, 1995, p. 275). A low amount of previous musical training was defined as zero to four years. The middle level of previous musical training was defined as five to nine years. A high level of previous musical training was defined as ten or more years. Participants selected which range best described them individually. Out of the sample of 71 participants, 22 (30.99%) indicated a low level of previous musical training, 28 (39.43%) indicated a middle level amount of previous musical training, and 21 (29.58%) indicated a high level of previous musical training.

Effect of Presentation Mode on Perceived Level of Quality

To answer the first research question, participants’ ratings of the quality of the performance were analyzed for each presentation mode. Participants experienced an a cappella choral performance presented using an audio-only recorded, audio-visual
recorded, and live presentation mode. Participants rated the level of overall quality of the performance using a four-point Likert-type scale.

**Descriptive statistics.** Measures of central tendency, dispersion, and variability were calculated for each rating of the overall quality of the performance for each presentation mode.

Table 2

*Mean Quality of Performance Ratings*

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>$M$</th>
<th>$SD$</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-only recorded</td>
<td>3.39</td>
<td>.573</td>
<td>-.275</td>
<td>-.759</td>
</tr>
<tr>
<td>Audio-visual recorded</td>
<td>2.92</td>
<td>.751</td>
<td>-.067</td>
<td>-.705</td>
</tr>
<tr>
<td>Live performance</td>
<td>3.94</td>
<td>.232</td>
<td>-3.932</td>
<td>13.849</td>
</tr>
</tbody>
</table>

Ratings of overall quality of the performance for audio-only recording of an *a cappella* choral performance ranged from a low score of two to a high score of four. Both the median and modal score was 3.00. The mean rating was 3.39 (see Table 2). A comparison of the frequency of each rating is displayed in Figure 4. Only 4.23% of participants ($n = 3$) rated the quality of the audio-only presentation with a score of two. Over half of the participants (52.11%, $n = 37$) rated the quality of the performance in the audio-only presentation mode as a three. The remaining participants (43.66%, $n = 31$) rated the quality of the performance in the audio-only presentation mode as excellent with a score of four.
The ratings of overall quality of the performance for audio-visual recording of an *a cappella* choral performance ranged from a low score of one to a high score of four. Both the median and modal score was 3.00. The mean rating was 2.92 (see Table 2). A comparison of the frequency of each rating is displayed in Figure 4. Only 1.41% of participants (*n* = 1) rated the quality of the audio-visual presentation as being poor with a score of one. Twenty participants (28.17%) rated the quality of the audio-visual recorded performance with a score of two. Almost half of the participants (47.89%, *n* = 34) rated the quality of the performance in the audio-visual presentation mode as a three. The remaining participants (22.53%, *n* = 16) rated the quality of the performance in the audio-only presentation mode as excellent with a score of four.

![Figure 4](image-url)  
*Figure 4. Frequency of quality rating by presentation mode.*
After analyzing the ratings of the first two presentation modes, I analyzed the quality ratings of the live performance. Ratings of overall quality of the live performance of an *a cappella* choral work ranged from a low score of three to a high score of four. Both the median and modal score was 4.00. The mean rating was 3.94 (see Table 2). A comparison of the frequency of each rating is displayed in Figure 4. Only 5.63% of participants (*n* = 4) rated the quality of the audio-visual presentation with a score of three. The majority of participants (94.37%, *n* = 67) rated the quality of the performance in the live presentation mode as excellent with a score of four. Based on a review of a histogram of the data including the mean ratings of quality, standard deviations, the skewness, and kurtosis values reported in Table 2, it was concluded that the ratings for the audio-only and audio-visual presentation modes approach a normal distribution. Participants’ ratings of the choral performance in the live presentation mode were not normally distributed.

**Results of a three-way repeated measures MANCOVA.** A three-way repeated measures MANCOVA was calculated to test if the means between participants’ ratings of overall quality were significantly different between presentation modes.

*Mauchly’s test of sphericity.* Mauchly’s test of sphericity was used to determine whether the variance of the difference between each pair of repeated measures was approximately equal. This test was important because if sphericity cannot be assumed, a modification to the degrees of freedom would be required so that a valid *F*-ratio could be obtained. The result of Mauchly’s test of sphericity of the variance of the difference between each pair of repeated measures was not significant (*χ²* [2] = 3.857, *p* > .05, *W* =
Because the results of this test were not significant at the $\alpha = .05$ level, the assumption of sphericity was not violated.

**Box’s test of equality of covariance matrices.** Box’s test of equality of covariance matrices was computed to test the assumption of equal variances of the dependent variables (quality ratings) across groups. The result of Box’s test of equality of covariance matrices was not significant (Box’s $M = 12.796, F[12, 2791.385] = .869, p > .05$). Because the result was not significant, the assumption of the equality of the covariance matrices was not violated.

**Multivariate analysis.** Based on the results of a multivariate analysis comparing the means of the quality ratings of each presentation mode, presentation mode had a significant main effect on participants’ overall ratings of the quality of the performances they experienced in this study ($F[2, 56] = 23.947, p < .001, \eta_p^2 = .461$).

**Test of within-subjects effect.** The within-subjects effects of presentation mode were computed to examine how an individual’s ratings could change depending on the presentation mode. The within-subjects effect of presentation mode was a significant predictor of participants’ ratings of the quality of a choral performance when the presentation mode for each *a cappella* choral performance was changed ($F[2, 114] = 27.416, p < .001, \eta_p^2 = .325$). Based on this result, 32.5% of within-subjects variance can be accounted for by presentation mode.

**Test of between-subjects effect.** The between-subjects effects of presentation mode were computed to examine differences between participants on their ratings of the quality of each choral performance. The between-subjects effect of presentation mode
was significant \( F[1, 57] = 1548.160, p < .001, \eta_p^2 = .964 \). Based on this result, 96.4% of between-subjects variance can be accounted for by the presentation mode.

**Pairwise comparison.** After reviewing the data, the estimated marginal means of the quality ratings of each performance for each presentation mode were calculated and compared. I used estimated marginal means to control for the effects of other variables (age, years of musical training, and gender). The marginal mean for the live presentation mode was the highest \( M = 3.952 \), followed by the audio-only recorded choral performance \( M = 3.500 \) and the audio-visual recorded choral performance \( M = 2.732 \) had the lowest estimated marginal mean. The estimated marginal mean of the quality of each choral performance was compared for each presentation mode (see Table 3).

Table 3

*Pairwise Comparisons of Estimated Population Means for Quality of a Choral Performance in Each Presentation Mode*

<table>
<thead>
<tr>
<th>(I) PresentationMode</th>
<th>(J) PresentationMode</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>Sig. c</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-only recorded</td>
<td>Audio-visual recorded</td>
<td>.768* b</td>
<td>.142</td>
<td>.000</td>
</tr>
<tr>
<td>Audio-only recorded</td>
<td>Live performance</td>
<td>-.453* b</td>
<td>.114</td>
<td>.000</td>
</tr>
<tr>
<td>Audio-visual recorded</td>
<td>Audio-only recorded</td>
<td>-.768* b</td>
<td>.142</td>
<td>.000</td>
</tr>
<tr>
<td>Audio-visual recorded</td>
<td>Live performance</td>
<td>-1.221* b</td>
<td>.138</td>
<td>.000</td>
</tr>
<tr>
<td>Live performance</td>
<td>Audio-only recorded</td>
<td>.453* b</td>
<td>.114</td>
<td>.000</td>
</tr>
<tr>
<td>Live performance</td>
<td>Audio-visual recorded</td>
<td>1.221* b</td>
<td>.138</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note: Based on estimated marginal means. b Based on modified population marginal mean.

*Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

* p < .001

Based on the results displayed in Table 3, it was clear that there were significant
differences \((p < .001)\) between the estimated marginal means of each presentation mode. The largest difference was between the marginal mean of the ratings of the quality of the live performance compared with the marginal mean for the audio-visual recorded performance. The resulting multivariate effect of presentation mode was significant \((\Lambda = .421, F[2, 56] = 38.542, p < .001, \eta_p^2 = .579)\).

**Effects of Age, Gender, and Musical Training on Ratings of Quality**

In addition to presentation mode, I wanted to know if participants’ age, gender, or previous musical training had any effect on participants’ ratings of the quality of a choral performance. To answer this question, I collected quantitative demographic data in addition to the participants’ ratings of the quality of each choral performance.

**Descriptive statistics.** Measures of central tendency were calculated for each rating of the overall quality of the performance for each presentation mode controlling for participants’ age, gender, and years of musical training.

**Presentation mode.** Based on a comparison of descriptive statistics and a comparison of means (see Table 4), there were some differences in participants’ ratings of the audio-only performance when controlling for age, gender, and years of musical training. Younger participants (18-24 years old) rated the quality of the audio-only recording slightly lower \((M = 3.35)\) than participants that were older \((25-44, M = 3.57)\) (see Table 4). Males rated the quality of the audio-only performance lower \((M = 3.36)\) than females \((M = 3.43)\). Males in the 18-24 and 25-44 year old age ranges tended to rate the quality of the audio-only performance lower than females. Participants that stated they received a low level of previous musical training rated the quality of the audio-only
recorded choral performance slightly lower \((M = 3.23)\) than participants that stated they received a middle level \((M = 3.46)\) or high level \((M = 3.48)\) of previous musical training.

Table 4

**Summary of Means for Quality, Age, and Gender—Audio-Only**

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Audio-Only Recording</td>
<td>18-24</td>
<td>Male</td>
<td>3.31</td>
<td>.541</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.38</td>
<td>.571</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.35</td>
<td>.552</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.50</td>
<td>.837</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.63</td>
<td>.518</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.57</td>
<td>.646</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.00</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.00</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.50</td>
<td>.707</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.36</td>
<td>.593</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.43</td>
<td>.558</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.39</td>
<td>.573</td>
<td>71</td>
<td></td>
</tr>
</tbody>
</table>

Based on a comparison of descriptive statistics and a comparison of means (see Table 5), there were some differences in participants’ ratings of the audio-visual performance when controlling for age, gender, and years of musical training. Younger participants (18-24 years old) tended to rate the quality of the audio-visual performance higher \((M = 3.04)\) than older participants \((25-44, M = 2.50)\). Male participants rated the quality of the audio-only performance lower \((M = 2.83)\) than females \((M = 3.00)\). Male participants in the 18-24 year old age range tended to rate the quality of the audio-visual
performance lower than females. This was especially true for males that stated they received a lower amount of previous musical training than those with more musical training. Participants that stated they received a low level of previous musical training rated the quality of the audio-visual recorded choral performance slightly lower ($M = 2.73$) than participants identifying as receiving a middle level ($M = 2.96$) or high level ($M = 3.05$) of previous musical training.

Table 5

*Summary of Means for Quality, Age, and Gender—Audio-Visual*

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>2.89</td>
<td>0.772</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>Female</td>
<td>3.19</td>
<td>0.634</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.04</td>
<td>0.719</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.5</td>
<td>0.837</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>Female</td>
<td>2.5</td>
<td>0.756</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.5</td>
<td>0.76</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Quality Audio-Visual Recording</td>
<td>Female</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.5</td>
<td>0.707</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.83</td>
<td>0.775</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Female</td>
<td>3</td>
<td>0.728</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.92</td>
<td>0.751</td>
<td>71</td>
<td></td>
</tr>
</tbody>
</table>

Based on a comparison of descriptive statistics and a comparison of means (see Table 6), there were some differences in participants’ ratings of the live performance
when controlling for age, gender, and years of musical training. Participants appeared to rate the quality of the live performance similarly regardless of age (18-24, $M = 3.95$; 25-44, $M = 3.93$). Both male and female participants rated the quality of the live performance equally with a mean of 3.94 for both genders. Male participants in the 18-24 year old age range tended to rate the quality of the live performance slightly higher than females. In the 25-44 year old age range, males tended to rate the quality of the live performance slightly lower than females. Participants that stated they received a low level of previous musical training rated the quality of the live choral performance

Table 6

*Summary of Means for Quality, Age, and Gender—Live Performance*

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-24</td>
<td>Male</td>
<td>3.97</td>
<td>0.186</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>3.92</td>
<td>0.272</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3.95</td>
<td>0.229</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>25-44</td>
<td>Male</td>
<td>3.83</td>
<td>0.408</td>
<td>6</td>
</tr>
<tr>
<td>Quality Live</td>
<td></td>
<td>Female</td>
<td>4</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td>Total</td>
<td>3.93</td>
<td>0.267</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>Male</td>
<td>4</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>4</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>3.94</td>
<td>0.232</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>3.94</td>
<td>0.236</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3.94</td>
<td>0.232</td>
<td>71</td>
</tr>
</tbody>
</table>
slightly lower \( (M = 3.86) \) than participants that stated they received a middle level \( (M = 3.96) \) or high level \( (M = 4.00) \) of previous musical training.

**Age.** A comparison of the frequency of participants' ratings of the quality of the performance for the audio-only presentation mode revealed that several differences in the perception of quality existed between participants based on age. The results are displayed in Figure 5. Participants in the 18-24 year age range tended to rate the quality of the performance presented in the audio-only presentation mode as a three on a four-point Likert-type scale. More participants between the ages of 25 and 44 rated the quality of the

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**Figure 5.** Frequency of ratings of quality of each presentation mode compared by participant age. (AO = Audio-only; AV = Audio-visual; Live = Live Performance)
performance higher than their younger counterparts with the majority rating the quality at the highest level of four.

After comparing the frequency of participants' ratings of the quality of the performance of the audio-only presentation, I then compared the frequency of ratings for the audio-visual presentation mode. By completing the analysis, I revealed that several differences in the perception of quality existed between participants based on age. Participants in the 18-24 year age range tended to rate the quality of the performance presented in the audio-visual presentation mode as a three on a four-point Likert-type scale. Participants in the 18-24 year age range used the full range of scores on the four-point Likert-type scale than participants in the other age ranges. More participants between the ages of 25 and 44 rated the quality of the performance lower than their younger counterparts with the majority rating the quality as a two on a four-point Likert-type scale.

Finally, after completing a comparison of the frequency of participants' ratings of the quality of the performance for the live presentation mode, I revealed that several similarities in the perception of quality existed between participants based on age. A few participants in the 18-24 and 25-44 year old age ranges rated the quality of the live performance as a three on a four-point Likert-type scale. Generally, participants used a narrower range of the four-point Likert-type scale when compared by age than for any other presentation. The majority of all participants regardless of age rated the live performance as a four. The consistency and agreement between participants on the rating of the live performance was greater than for any other presentation mode. There was very
little difference between participants’ ratings of the quality of the live performance compared to any other presentation mode when controlling for participants’ age.

**Gender.** Although there were differences between participants’ ratings of quality when comparing age and ratings of quality for the audio-only recorded performance, there appeared to fewer differences when comparing frequency of ratings according to gender. The results comparing the frequency of quality rating and gender are displayed in Figure 6. Nineteen male and 18 female participants rated the quality of the audio-only choral performance as a three on a four-point Likert-type scale. Two males and one female rated the quality as a two, and 15 males and 16 females rated the quality as a four. Male and female ratings of quality were similar.

![Figure 6. Frequency of ratings of quality of each presentation mode compared by participant gender.](image)
There appeared to be no difference when comparing frequency of ratings according to gender for the live presentation mode. The same number of male and female participants ($n = 2$ each) rated the quality of the live performance as a three on a four-point Likert-type scale. The remaining 67 participants, regardless of gender, rated the quality of the live performance as a four.

**Years of musical training.** In addition to differences between the frequencies of ratings of the quality of the audio-only recorded performance when controlling for age and gender, there were differences between participants' ratings based on participants' stated years of musical training (see Figure 7).

![Figure 7](image_url)  
*Figure 7.* Frequency of ratings of quality of each presentation mode compared by years of musical training.
Participants that stated they had received between five and nine years of musical training rated the quality of the audio-only performance using a smaller range of only three or four points on a four-point Likert-type scale. Although the participants with middle level of years of musical training used a narrower and higher range, participants with a high level of previous musical training rated the quality of the audio-only performance higher than any other group of participants based on training. Comparatively, participants with a lower or higher level of musical training used a wider range of ratings compared to those with a middle level of musical training; however, the use of a lower rating of two was less common across groups.

There were also differences between participants’ ratings of quality based on participants’ stated years of musical training. There is a trend in the ratings that the lower amount of previous musical training a participant had, the lower the rating of the quality of the audio-visual performance. Participants that stated they had a low or middle level of musical training rated the quality of the audio-only performance using a smaller range of two, three, or four points on a four-point Likert-type scale. Although the participants with a low or middle level amount of years of musical training used a narrower range, participants with a high level of previous musical training rated the quality of the audio-visual performance higher than any other group of participants based on training. Overall, participants that stated that they had a high level of previous musical training (10+ years) rated the quality of the audio-visual performance higher than other participants with a lower amount of previous musical training.
When comparing the frequency of ratings of the live performance controlling for participants' years of previous musical training, some minor differences appeared in the data. Three out of the four participants that rated the quality of the live performance as a three on a four-point Likert-type scale stated that they had received a low level (0-4 years) of previous musical training. Only one participant that rated the quality of the live performance as a three stated they had received a middle level of previous musical training. Participants that stated that they had a high level of previous musical training (10+ years) all rated the quality of the live performance as a four (excellent). Overall, the majority of participants, regardless of the stated amount of previous musical training, gave the highest quality rating for live a cappella choral performance.

**Results of a three-way repeated measures MANCOVA.** A three-way repeated measures MANCOVA was calculated to test if the means between participants' ratings of performance quality were significantly different between presentation modes controlling for age, gender, and years of previous musical training.

**Multivariate analysis.** After examining the results of a multivariate test of the main effect of the interaction of age and on participants' ratings of the quality of the performance when presentation mode was changed, participant age did not have a significant effect on participants' rating of quality ($F[4, 114] = .628, p > .05, \eta^2_p = .022$). The main effect of the interaction of participants' gender and their ratings of the quality of the performance was not significant ($F[2, 56] = .030, p > .05, \eta^2_p = .001$). The main effect of the interaction of participants' ratings of the quality of the performance and years of previous musical training was also not significant ($F[4, 114] = .671, p > .05, \eta^2_p$).
When different combinations of independent variables were combined with presentation mode, there again was no significant main effect when multiple independent variables or covariate were controlled for.

**Test of within-subjects effects.** The within-subjects effects of rating of quality controlling for age, gender, and years of previous musical training were computed to examine how an individual's perceived level of quality was different depending on the presentation mode based on the independent variables and covariate. Age was a significant predictor of participants' perceived level of quality \( (F[4, 114] = 2.928, p < .05, \eta^2_p = .093) \). Gender and years of previous musical training were not significant predictors of a participants' rating of the quality of each performance. There were no combinations of independent variables were significant predictors of participants' ratings of the quality (see Table 7).

Table 7

*Within-subjects Effects of IV's and Covariate on Quality of Performance Ratings*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>(\eta^2_p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>14.927</td>
<td>2</td>
<td>27.416</td>
<td>.000**</td>
<td>.325</td>
</tr>
<tr>
<td>Quality * Age</td>
<td>3.188</td>
<td>4</td>
<td>2.928</td>
<td>.024*</td>
<td>.093</td>
</tr>
<tr>
<td>Quality * Gender</td>
<td>.015</td>
<td>2</td>
<td>.028</td>
<td>.973</td>
<td>.000</td>
</tr>
<tr>
<td>Quality * MusTrainYrs</td>
<td>.877</td>
<td>4</td>
<td>.805</td>
<td>.524</td>
<td>.027</td>
</tr>
<tr>
<td>Quality * Age * Gender</td>
<td>.787</td>
<td>2</td>
<td>1.445</td>
<td>.240</td>
<td>.025</td>
</tr>
<tr>
<td>Quality * Age * MusTrainYrs</td>
<td>.681</td>
<td>4</td>
<td>.626</td>
<td>.645</td>
<td>.021</td>
</tr>
<tr>
<td>Quality * Gender * MusTrainYrs</td>
<td>.167</td>
<td>4</td>
<td>.154</td>
<td>.961</td>
<td>.005</td>
</tr>
<tr>
<td>Quality * Age * Gender * MusTrainYrs</td>
<td>.441</td>
<td>4</td>
<td>.405</td>
<td>.805</td>
<td>.014</td>
</tr>
<tr>
<td>Error (Quality)</td>
<td>31.035</td>
<td>114</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( * p < .05, **p < .001 \)
Test of between-subjects effects. The between-subjects effects controlling for the interaction of age, gender, and years of previous musical training were examined to see if the independent variables and covariate were significant predictors between participants' ratings of the quality of a choral performance (see Table 8). After examination of the results of between-subjects effects, age, gender, and years of previous musical training were not significant predictors of differences between participants' ratings of the quality of a choral performance when the presentation mode was changed.

Table 8

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>( \eta_p^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>620.044</td>
<td>1</td>
<td>1548.160</td>
<td>.964</td>
</tr>
<tr>
<td>Age</td>
<td>.173</td>
<td>2</td>
<td>.215</td>
<td>.008</td>
</tr>
<tr>
<td>Gender</td>
<td>.065</td>
<td>1</td>
<td>.161</td>
<td>.003</td>
</tr>
<tr>
<td>MusTrainYrs</td>
<td>1.315</td>
<td>2</td>
<td>1.641</td>
<td>.054</td>
</tr>
<tr>
<td>Age * Gender</td>
<td>.178</td>
<td>1</td>
<td>.445</td>
<td>.008</td>
</tr>
<tr>
<td>Age * MusTrainYrs</td>
<td>.099</td>
<td>2</td>
<td>.123</td>
<td>.004</td>
</tr>
<tr>
<td>Gender * MusTrainYrs</td>
<td>.686</td>
<td>2</td>
<td>.856</td>
<td>.029</td>
</tr>
<tr>
<td>Age * Gender * MusTrainYrs</td>
<td>.307</td>
<td>2</td>
<td>.383</td>
<td>.013</td>
</tr>
<tr>
<td>Error</td>
<td>22.829</td>
<td>57</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pairwise Comparison. After completing an analysis of the within-subjects and between-subjects effects of the independent variables of age and years of previous musical training, and the covariate of gender, a pairwise comparison of the results of the differences of estimated marginal means of the ratings of quality based on presentation mode was completed. This comparison was made because the interaction of age was a significant predictor of an individual participant's rating of the quality of the performance. Based on the results displayed in Table 9, there is a significant difference
between the means of ratings participants in the age 18 to 24 year old age group when compared to participants in the 24 to 44 year old age group for the audio-only recorded presentation mode specifically. No other significant differences were evident in pairwise comparisons of age, gender, or years of previous musical training.

Table 9

*Pairwise Comparison of Ratings of Quality Based on Age*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age (I)</th>
<th>Age (J)</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>Sig. b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>18-24</td>
<td>25-44</td>
<td>.614 *</td>
<td>.221</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45-64</td>
<td>.665</td>
<td>.520</td>
<td>.206</td>
</tr>
<tr>
<td>Audio-Only Recording</td>
<td>18-24</td>
<td>25-44</td>
<td>-.614 *</td>
<td>.221</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45-64</td>
<td>.051</td>
<td>.545</td>
<td>.926</td>
</tr>
<tr>
<td></td>
<td>18-24</td>
<td>45-64</td>
<td>-.665</td>
<td>.520</td>
<td>.206</td>
</tr>
<tr>
<td></td>
<td>25-44</td>
<td>45-64</td>
<td>-.051</td>
<td>.545</td>
<td>.926</td>
</tr>
</tbody>
</table>

Note: Based on estimated marginal means. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

*p < .01

**Effect of Presentation Mode on Perceived Level of Engagement**

To answer the third research question, participants’ ratings of their perceived level of engagement with the music were analyzed for each presentation mode. Participants rated their perceived level of engagement when experiencing music in each presentation mode using a four-point Likert-type scale. The only qualifiers provided on the data collection form for participants were that a score of one was little engagement and a score of four was very engaged.
Descriptive statistics. Measures of central tendency, distribution, and variability were calculated for each rating of participants’ perceived level of engagement with the music during each performance for each presentation mode.

Table 10

*Mean Perceived Level of Engagement Ratings*

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-only recorded</td>
<td>2.70</td>
<td>.901</td>
<td>-.096</td>
<td>-.792</td>
</tr>
<tr>
<td>Audio-visual recorded</td>
<td>2.61</td>
<td>.727</td>
<td>-.080</td>
<td>-.281</td>
</tr>
<tr>
<td>Live performance</td>
<td>3.93</td>
<td>.258</td>
<td>-3.431</td>
<td>10.053</td>
</tr>
</tbody>
</table>

Ratings of engagement with the music for the audio-only recording of an *a cappella* choral performance ranged from a low score of one to a high score of four. Both the median and modal score was 3.00. The mean rating of engagement level was 2.70 (see Table 10). A comparison of the frequency of each rating of engagement is displayed in Figure 8. Only 8.45% of participants (*n* = 6) rated their engagement level with the music using the audio-only recorded presentation mode with a score of one (little). Twenty-four of the participants (33.80%) rated their engagement level with the audio-only presentation with a score of two. Twenty-six of the participants (36.62%) rated their engagement level with the audio-only presentation with a score of three. The remaining participants (21.13%, *n* = 15) rated their level of engagement with the music for the audio-only presentation mode as very engaged with a score of four.
Figure 8. Frequency of ratings of perceived level of engagement by presentation mode.

The ratings of perceived level of engagement with the music for the audio-visual recording of an *a cappella* choral performance ranged from a low score of one to a high score of four. Both the median and modal score was 3.00. The mean rating was 2.61 (see Table 10). A comparison of the frequency of each rating of engagement is displayed in Figure 8. Only 4.23% of participants (*n* = 3) rated their engagement level with the music using the audio-visual recorded presentation mode with a score of one (little). Twenty-nine of the participants (40.85%) rated their engagement level with the audio-visual presentation with a score of two. Thirty-two of the participants (45.07%) rated their engagement level with the audio-visual presentation with a score of three. The remaining participants (9.85%, *n* = 7) rated their level of engagement with the music for the audio-
visual presentation mode as very engaged with a score of four.

After analyzing the ratings of the first two presentation modes, I analyzed the engagement ratings of the live performance. Ratings of participants’ perceived level of engagement with the music during the live performance of an *a cappella* choral work ranged from a low score of three to a high score of four. Both the median and modal score was 4.00. The mean rating was 3.93 (see Table 10). A comparison of the frequency of each rating is displayed in Figure 8. Only 7.04% of participants (*n* = 5) rated the quality of the audio-visual presentation with a score of three. The majority of participants (92.96%, *n* = 66) rated the quality of the performance in the live presentation mode as excellent with a score of four. Based on a review of a histogram of the data including the mean ratings of quality, standard deviations, the skewness, and kurtosis values reported in Table 10, it was concluded that participants’ ratings of perceived level of engagement for the audio-only and audio-visual presentation modes approach a normal distribution. Participants’ ratings of their perceived level of engagement during the live presentation were not normally distributed.

**Results of a three-way repeated measures MANCOVA.** A three-way repeated measures MANCOVA was calculated to test if the means between participants’ ratings of perceived level of engagement were significantly different between presentation modes.

*Mauchly’s test of sphericity.* Mauchly’s test of sphericity was used to determine whether the variance of the difference between each pair of repeated measures was approximately equal. This test is important because if sphericity cannot be assumed, a modification to the degrees of freedom would be required so that a valid *F*-ratio could be
obtained. The result of Mauchly’s test of sphericity of the variance of the difference between each pair of repeated measures was significant ($\chi^2 [2] = 10.07, p < .01, W = .835$). Because the results of this test were significant at the $\alpha = .05$ level, then the assumption of sphericity was violated. To obtain a valid $F$-ratio, the Greenhouse-Geisser correction statistic was applied ($\varepsilon = .859$) to correct for the sphericity.

**Box’s test of equality of covariance matrices.** Box’s test of equality of covariance matrices was computed to test the assumption of equal variances of the dependent variables (engagement level ratings) across groups. The result of Box’s test of equality of covariance matrices was not significant (Box’s $M = 10.099, F [12, 2791.434] = .707, p > .05$). Because the result was not significant, the assumption of the equality of the covariance matrices was not violated.

**Multivariate analysis.** Based on the results of a multivariate analysis comparing the mean ratings of participants’ perceived level of engagement with the music for each presentation mode, it appears that presentation mode has a significant main effect on participants’ perceived level of engagement ($F [2, 56] = 49.235, p < .001, \eta_p^2 = .637$).

**Test of within-subjects effect.** The within-subjects effect of presentation mode was computed to examine how an individual’s perceived level of engagement can change depending on the presentation mode. The within-subjects effect of presentation mode was a significant predictor of participants’ perceived level of engagement with the music when the presentation mode for each a cappella choral performance was changed ($F [1.717, 97.881] = 30.626, p < .001, \eta_p^2 = .350$). Based on this result, 35% of the within-subjects variance was attributed to presentation mode.
**Test of between-subjects effect.** The between-subjects effect of presentation mode was computed to examine if participants differ on their level of engagement with the music for each choral performance. The between-subjects effect of presentation mode was significant \(F[1, 57] = 844.924, p < .001, \eta^2_p = .937\). Based on this result, 93.7% of between-subjects variance was attributed to presentation mode.

**Pairwise comparison.** After reviewing the data, the estimated marginal means of the level of engagement ratings of each performance for each presentation mode were calculated and compared. The marginal mean for the live presentation mode was the highest \(M = 3.967\), followed by the audio-only recorded choral performance \(M = 2.693\) and the audio-visual recorded choral performance \(M = 2.546\) had the lowest level of engagement.

Table 11

<table>
<thead>
<tr>
<th>(I) Presentation Mode</th>
<th>(J) Presentation Mode</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>Sig. (^c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-only recorded</td>
<td>Audio-visual recorded</td>
<td>.147(^a)</td>
<td>.185</td>
<td>.428</td>
</tr>
<tr>
<td></td>
<td>Live performance</td>
<td>-1.273(^{a,*})</td>
<td>.167</td>
<td>.000</td>
</tr>
<tr>
<td>Audio-visual recorded</td>
<td>Audio-only recorded</td>
<td>-.147(^a)</td>
<td>.185</td>
<td>.428</td>
</tr>
<tr>
<td></td>
<td>Live performance</td>
<td>-1.421(^{a,*})</td>
<td>.127</td>
<td>.000</td>
</tr>
<tr>
<td>Live performance</td>
<td>Audio-only recorded</td>
<td>1.273(^{a,*})</td>
<td>.167</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Audio-visual recorded</td>
<td>1.421(^{a,*})</td>
<td>.127</td>
<td>.000</td>
</tr>
</tbody>
</table>

Note: Based on estimated marginal means. \(^a\)Based on modified population marginal mean. \(^c\)Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments). \(* p < .001\)
estimated marginal mean. The estimated marginal mean of the perceived level of engagement with the music for each choral performance was compared for each presentation mode. The results of this comparison are displayed in Table 11.

After examining the results in Table 11, significant differences \((p < .001)\) between the estimated marginal means of level of engagement of the audio-only and audio-visual presentation modes when compared with the mean of the performances presented using a live presentation mode. There were no significant differences between the marginal means of the level of engagement of the audio-only recorded presentation mode when compared to the marginal mean of engagement level for the audio-visual presentation mode. The largest difference was between the marginal mean of the ratings of the quality of the live performance compared with the marginal mean for the audio-visual recorded performance. The resulting multivariate effect of presentation mode was significant \((\Lambda = .273, F [2, 56] = 74.642, p < .001, \eta^2_p = .727)\).

**Effect of Age, Gender, and Musical Training on Ratings of Engagement**

The fourth quantitative research question that I wanted to answer was if participants' age, gender, or previous musical training had any effect on participants' ratings of perceived level of engagement with the music during each choral performance. To answer this question, I collected quantitative demographic data in addition to ratings of participants' perceived level of engagement with the music for each performance.

**Descriptive statistics.** Measures of central tendency were calculated for each rating of participants' perceived level of engagement with the music for each performance in each presentation mode controlling for participants' age, gender, and
years of musical training.

**Presentation mode.** Based on a comparison of the descriptive statistics and summary of means (see Table 12), there were some differences in participants' ratings of their perceived level of engagement with the music during the audio-only performance when controlling for age, gender, and years of musical training. Younger participants (18-24 years old) rated their engagement with the audio-only recording ($M = 2.73$) slightly higher than participants that were older (25-44, $M = 2.64$).

Table 12

**Summary of Means for Engagement, Age, and Gender—Audio-Only**

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18-24</td>
<td>Male</td>
<td>2.72</td>
<td>.922</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>2.73</td>
<td>.962</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.73</td>
<td>.932</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>25-44</td>
<td>Male</td>
<td>2.67</td>
<td>1.211</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>2.63</td>
<td>.518</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.64</td>
<td>.842</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>Male</td>
<td>3.00</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>2.00</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.50</td>
<td>.707</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Male</td>
<td>2.72</td>
<td>.944</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>2.69</td>
<td>.867</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>2.70</td>
<td>.901</td>
<td>71</td>
</tr>
</tbody>
</table>

Males rated their engagement with the audio-only performance higher ($M = 2.72$) compared to females ($M = 2.69$). Male participants in the 25-44 age range rated their
level of engagement with the audio-only performance lower than male participants in any other age range. Participants identifying as having received a low level of previous musical training rated their level of engagement with the audio-only recorded choral performance lower ($M = 2.41$) than participants identifying as receiving a middle level ($M = 2.82$) or high level ($M = 2.86$) of previous musical training.

Based on a comparison of the descriptive statistics and summary of means (see Table 13), there were differences in participants' ratings of their perceived level of engagement with the music during the audio-visual recorded performance when controlling for age, gender, and years of musical training. Younger participants (18-24 years old) rated their engagement with the audio-only recording slightly higher ($M = 2.67$) than participants that were older (25-44, $M = 2.43$) (see Table 13). Male participants rated their engagement with the audio-visual performance almost the same ($M = 2.53$) compared to female participants ($M = 2.69$). Interestingly, the mean score of female participants was the exact same for the audio-visual performance as in the audio-only performance. Male participants in the 25-44 year old age range identifying as having received a low level of previous musical training rated their level of engagement with the audio-only recorded choral performance the lowest of any group ($M = 1.67$).
Table 13

**Summary of Means for Engagement, Age, and Gender—Audio-Visual**

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>$M$</th>
<th>$SD$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>2.59</td>
<td>.780</td>
<td>29</td>
</tr>
<tr>
<td>18-24</td>
<td>Female</td>
<td>2.77</td>
<td>.710</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.67</td>
<td>.747</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.33</td>
<td>.816</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>Female</td>
<td>2.50</td>
<td>.535</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.43</td>
<td>.646</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.00</td>
<td>.000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>45-64</td>
<td>Female</td>
<td>2.00</td>
<td>.000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.00</td>
<td>.000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>2.53</td>
<td>.774</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Female</td>
<td>2.69</td>
<td>.676</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.61</td>
<td>.727</td>
<td>71</td>
<td></td>
</tr>
</tbody>
</table>

Based on a comparison of the descriptive statistics and summary of means (see Table 14), there were few differences in participants’ ratings of their perceived level of engagement with the music during the live choral performance when controlling for age, gender, and years of musical training. Younger participants (18-24 years old) rated their engagement with the live performance ($M = 3.91$) slightly lower than participants that were older (25-44, $M = 4.00$) (see Table 21). Males rated their engagement with the live performance slightly lower ($M = 3.89$) compared to females ($M = 3.97$). Male participants in the 18-24 year old age range identifying as having received a low level of previous musical training rated their level of engagement with the live choral performance the lowest of any group of participants ($M = 3.86$).
Table 14

Summary of Means for Engagement, Age, and Gender—Live Performance

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>Age</th>
<th>Gender</th>
<th>M</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>3.86</td>
<td>.351</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>Female</td>
<td>3.96</td>
<td>.196</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.91</td>
<td>.290</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.00</td>
<td>.000</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>Female</td>
<td>4.00</td>
<td>.000</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.00</td>
<td>.000</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>4.00</td>
<td>.000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>45-64</td>
<td>Female</td>
<td>4.00</td>
<td>.000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.00</td>
<td>.000</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>3.89</td>
<td>.319</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Female</td>
<td>3.97</td>
<td>.169</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.93</td>
<td>.258</td>
<td>71</td>
<td></td>
</tr>
</tbody>
</table>

**Age.** A comparison of the frequency of participants’ ratings of their perceived level of engagement with the audio-only presentation revealed that several differences in the perception of engagement exist between participants based on age. The results are displayed in Figure 9. Participants in the 18-24 year age range tended to rate their level of engagement with the audio-only performance as two or three on a four-point Likert-type scale. More participants in the 18-24 age range rated their level of engagement as a one (little) than in any other age range among participants. Participants between the ages of 25 and 44 rated their level of engagement similarly to those in the 18-24 age range with the majority of ratings being a three or two. The majority of participants across all age
ranges assigned a middle level rating rather than a rating on the higher or lower extremes of the Likert-type scale. There were no significant differences between ratings of engagement with the audio-only performance between any of the age groups.

Figure 9. Frequency of ratings of engagement with each presentation mode compared by participant age. (AO = Audio-only; AV = Audio-visual; Live = Live Performance)

After comparing the frequency of participants' ratings of their level of engagement with the audio-only presentation, I compared the frequency of ratings of their perceived level of engagement with the audio-visual presentation. The analysis revealed that several differences in the perception of engagement exist between participants based on age (see Figure 9). Participants in the 18-24 year age range tended to rate their level of engagement with the audio-visual performance as two or three on a four-point Likert-type scale. More participants in the 18-24 age range rated their level of engagement as a one
(little) than in any other age range among participants; however, the number of participants in the 18-24 age range rating their level of engagement as a one was smaller for the audio-visual performance than the audio-only performance. Participants between the ages of 25 and 44 rated their level of engagement similarly to those in the 18-24 age range with the majority of ratings being a two or three. None of the participants over the age of 24 rated their level of engagement as a four. The majority of participants across all age ranges assigned a middle level rating rather than a rating on the higher or lower extremes of the Likert-type scale. There were no significant differences between ratings of engagement with the audio-only performance between any of the age groups.

Finally, after completing a comparison of the frequency of participants’ ratings of their perceived level of engagement with the live choral performance, I revealed that very few differences in the perception of engagement exist between participants based on age see Figure 9). Five participants in the 18-24 year age range rated their level of engagement with the music for the live choral performance as a three on a four-point Likert-type scale. The remaining participants regardless of age \( n = 66 \) rated their level of engagement with the music during the live choral performance as a four (very). Other than a limited range of scores and an extremely small amount of variance across age ranges, there were no significant differences between ratings of engagement with the live choral performance between any of the age groups.

**Gender.** Although there were some general differences comparing age and the ratings participants assigned for their level of engagement with the audio-only recorded performance, there were additional differences between participants’ level of engagement
when controlling for gender. The results comparing the frequency of engagement rating and gender are displayed in Figure 10. The majority of male participants rated their level of engagement with the audio-only choral performance as a three on a four-point Likert-type scale. The majority of female participants rated their level of engagement lower than the male participants with the majority of female participants rating engagement as a score of two. Additionally, more male than female participants rated their level of engagement as either little (one) or very (four). Although there were some differences, overall there was no significant difference between the means of male or female ratings of engagement with the audio-only choral performance ($t = 0.75, p > .05$).

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**Figure 10.** Frequency of ratings of engagement with each presentation mode compared by participant gender.
Although there were differences comparing age and the ratings participants assigned for their level of engagement with the audio-visual recorded performance, there were additional differences between participants’ level of engagement when controlling for gender (see Figure 10). The majority of both male and female participants rated their level of engagement with the audio-visual recorded choral performance as a three on a four-point Likert-type scale. Many female participants rated their level of engagement slightly higher than the male participants with no female participants rating their level of engagement as a one. Additionally, more female participants rated their level of engagement as very (four). Although there were some differences, none of the differences were significant.

I compared the frequency participants’ ratings of engagement controlling for gender and found few differences existed (see Figure 10). Four male and one female student rated their level of engagement as a three on a four-point Likert-type scale. The remaining male ($n = 32$) and female ($n = 34$) participants rated their level of engagement with the live performance as a four. There was no significant difference between the means of male or female ratings of engagement level.

*Years of musical training.* In addition to some small differences between the frequencies of ratings of participants’ level of engagement with each performance when controlling for age and gender, there were some differences based on participants’ stated years of musical training (see Figure 11). Participants that stated they had received a low level of previous musical training at the time of data collection rated their level of engagement with the music lower than those with more musical training. More
participants with a lower level of previous musical training rated their level of engagement as a one or a two on a four-point Likert-type scale than participants with five or more years of musical training. Participants with a high level of previous musical training rated their level of engagement with the music higher than participants with less previous musical training. There were no significant differences between participants' ratings of level of engagement with the audio-only choral performance when grouped based on years of musical training.

Figure 11. Frequency of ratings engagement with each presentation mode compared by participants' years of musical training.
In addition to some small differences between the frequencies of ratings of participants’ level of engagement with the audio-visual recorded performance when controlling for age and gender, there were some differences based on participants’ stated years of musical training (see Figure 11). Participants that stated they had received a low level of previous musical training at the time of data collection rated their level of engagement with the music lower than those with a middle level of musical training and similarly to those with a higher amount of musical training. More participants with a lower level of previous musical training rated their level of engagement as a one or a two on a four-point Likert-type scale than participants with five or more years of musical training. Participants with a low level of musical training were the only group of participants to use one, the lowest level of engagement, for the audio-visual recorded choral performance. Participants with a middle level of musical training rated their level of engagement with the music higher than participants with more or less previous musical training. There were no significant differences between participants’ ratings of level of engagement with the audio-visual choral performance when grouped based on years of musical training.

Few differences were found when comparing the frequency of ratings of engagement level with the live choral performance when controlling for participants’ stated years of musical training (see Figure 11). Three participants that stated they had received a low level of previous musical training and two participants that stated they had a middle level of previous musical training at the time of data collection rated their level of engagement with the music as a three on a four-point Likert-type scale. The remaining
participants across all groups regardless of their level of previous musical training rated
their level of engagement with the live choral performance as a four (very). There were
no significant differences between participants' ratings of level of engagement with the
live choral performance when grouped based on years of musical training.

**Results of a three-way repeated measures MANCOVA.** A three-way repeated
measures MANCOVA was calculated to test if the means between participants' ratings of
perceived level of engagement with the music during each listening task were
significantly different between presentation modes controlling for age, gender, and years
of previous musical training.

**Multivariate analysis.** After examining the results of a multivariate test of the
main effect of the interaction of age and on participants' ratings of self-perceived level of
engagement with the performance when presentation mode was changed, participant age
did not have a significant effect on participants' level of engagement \((F[4, 114] = .628, p
> .05, \eta_p^2 = .022)\). The main effect of the interaction of participants' level of engagement
with the performance and gender was not significant \((F[2, 56] = 1.056, p > .05, \eta_p^2 =
.036)\). The main effect of the interaction of participants' ratings of engagement with the
performance and years of previous musical training was also not significant \((F[4, 114] =
1.406, p > .05, \eta_p^2 = .047)\). When different combinations of independent variables were
combined with presentation mode, there again was no significant main effect when
multiple independent variables or covariate were controlled for.

**Test of within-subjects effects.** The within-subjects effects of participants' ratings
of their perceived level of engagement for each performance controlling for age, gender,
and years of previous musical training were computed to examine how an individual’s engagement can change depending on the presentation mode when controlling for the independent variables. The independent variables or covariate of age, gender, and years of musical training were not a significant predictor of participants’ perceived level of engagement with the music when the presentation mode for each *a cappella* choral performance was changed. There were no combinations of independent variables that significantly affected participants’ engagement level with the music during any of the performances in any presentation mode (see Table 15).

Table 15

*Within-subjects Effects of IV’s and Covariate on Engagement with Performance Ratings*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>η²</th>
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<td>Engagement</td>
<td>24.961</td>
<td>1.717</td>
<td>30.626</td>
<td>.000*</td>
<td>.350</td>
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<tr>
<td>Engagement * Age</td>
<td>.656</td>
<td>3.434</td>
<td>.402</td>
<td>.778</td>
<td>.014</td>
</tr>
<tr>
<td>Engagement * Gender</td>
<td>1.161</td>
<td>1.717</td>
<td>1.424</td>
<td>.245</td>
<td>.024</td>
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<tr>
<td>Engagement * MusTrainYrs</td>
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<td>3.434</td>
<td>1.095</td>
<td>.359</td>
<td>.037</td>
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<tr>
<td>Engagement * Age * Gender</td>
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<td>1.717</td>
<td>.383</td>
<td>.651</td>
<td>.007</td>
</tr>
<tr>
<td>Engagement * Age * MusTrainYrs</td>
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<td>3.434</td>
<td>.505</td>
<td>.704</td>
<td>.017</td>
</tr>
<tr>
<td>Engagement * Gender * MusTrainYrs</td>
<td>1.242</td>
<td>3.434</td>
<td>.762</td>
<td>.534</td>
<td>.026</td>
</tr>
<tr>
<td>Engagement * Age * Gender * MusTrainYrs</td>
<td>2.456</td>
<td>3.434</td>
<td>1.507</td>
<td>.213</td>
<td>.050</td>
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<tr>
<td>Error (Engagement)</td>
<td>46.457</td>
<td>97.881</td>
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</tbody>
</table>

*p < .001

*Test of between-subjects effects.* The between-subjects effects controlling for the interaction of age, gender, and years of previous musical training were examined to see if
the independent variables and covariate were significant predictors between participants' ratings their perceived level of engagement with the music for each performance when the presentation mode was changed (see Table 16). After examination of the results of between-subjects effects, age and gender were not significant predictors of differences between participants' ratings of the quality of a choral performance when the presentation mode was changed. Participants' stated years of previous musical training (MusTrainYrs) up to the date of data collection had a significant interaction ($F[2, 57] = 3.476, p < .05, \eta_p^2 = .109$) with participants' perceived level of engagement when the presentation mode was changed.

Table 16

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>$F$</th>
<th>Sig.</th>
<th>$\eta_p^2$</th>
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<td>Intercept</td>
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<td>.937</td>
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<td>.022</td>
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<tr>
<td>Gender</td>
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<td>.000</td>
<td>.993</td>
<td>.000</td>
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<td>MusTrainYrs</td>
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<td>.109</td>
</tr>
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<td>.715</td>
<td>.401</td>
<td>.012</td>
</tr>
<tr>
<td>Age * MusTrainYrs</td>
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<td>.250</td>
<td>.779</td>
<td>.009</td>
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<tr>
<td>Gender * MusTrainYrs</td>
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<td>.635</td>
<td>.533</td>
<td>.022</td>
</tr>
<tr>
<td>Age * Gender * MusTrainYrs</td>
<td>1.342</td>
<td>2</td>
<td>1.151</td>
<td>.324</td>
<td>.039</td>
</tr>
<tr>
<td>Error</td>
<td>33.229</td>
<td>57</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* $p < .05$, ** $p < .001$

**Pairwise Comparison.** After completing an analysis of the within-subjects and between-subjects effects of the independent variables of age and years of previous musical training, and the covariate of gender, a pairwise comparison of the results of the
differences of estimated marginal means of the ratings of engagement level was completed. This comparison was made because the interaction of years of previous musical training was a significant predictor between participants for their ratings of the engagement with the music for each choral performance. After analyzing the results, there were no significant pairwise differences to be reported.

**Summary of Quantitative Results**

Quantitative methods were used to collect and analyze data to address four research questions in this study:

1. What effect, if any, does presentation mode have on participants' ratings of the quality of a choral performance?
2. What effect, if any, does participants' age, gender, or previous musical training have on participants' ratings of the quality of a choral performance?
3. What effect, if any, does presentation mode have on participants' ratings of their engagement with the music during a choral performance?
4. What effect, if any, does participants' age, gender, or previous musical training have on participants' ratings of their engagement with the music during a choral performance?

Seventy-one participants participated in the data collection for this study representing 89% of the total population being studied. Quantitative data were collected representing two dependent variables (perceived quality and perceived level of engagement) using three presentation modes (audio-only recorded, audio-visual recorded, live performance). To answer address each research questions, descriptive statistics were
computed and a three-way repeated measures MANCOVA was analyzed to understand the differences of the means for each presentation mode for the dependent variables and the effects of the independent variables of age, gender, and years of previous musical training on participants' ratings of the dependent variables.

**Summary of research questions 1 and 2.** After analyzing the descriptive statistics and frequency of ratings for the quality ratings of each presentation mode, I found that there were differences between the means of ratings for the quality of each presentation mode. The quality of the live presentation mode was rated the highest followed by the audio-only recording, and the audio-visual recording had the lowest quality rating. There was a significant within-subjects effect for quality ratings. The presentation mode had a significant effect \( p < .001 \) on participants' ratings of quality. This was evident in the pairwise comparison showing significant differences between the estimated population means for the quality of a choral performance in each presentation mode (see Table 3). Presentation mode had a significant between-subjects effect \( p < .001 \) on participants' ratings of the quality of each choral performance. Based on analysis of the data, presentation mode was a significant predictor of participants' ratings of the quality of the performance for each listening experience.

After completing analysis of the data for question 1, I analyzed the data controlling for participants' age, gender, and years of musical training and their interaction with participants' ratings of quality. Although there were differences between participants' ratings of the quality of each performance for each presentation mode, there were no significant main effects of the independent variables on participants' ratings of
quality. Age had a significant within-subjects effect \( (p < .05) \) on individual participants’ perceived quality of each choral performance when presentation mode was changed. The effect size was moderate \( (\eta_p^2 = .093) \). A pairwise comparison based on quality and age revealed that there was a significant difference between participants’ ratings of the quality of audio-only recorded presentation specifically between participants in the 18-24 and 25-44 year old age groups \( (p < .01) \). Gender and years of musical training, nor any combination of the independent variables, had any significant within-subjects or between-subjects effects on participants’ ratings of the quality of each choral performance.

**Summary of research questions 3 and 4.** After analyzing the descriptive statistics and frequency of ratings for participants’ ratings of their perceived level of engagement with the music for each presentation mode, I found that there were differences between the means of ratings for participants’ level of engagement. The participants’ perceived level of engagement was highest for the live presentation mode, followed by the audio-only recording, and the audio-visual recording had the lowest rating of engagement. It is important to note that the order (highest to lowest) of participants’ perceived level of engagement is identical to the ratings of the perceived quality of the performance. Presentation mode had a significant effect \( (p < .001) \) on participants’ ratings of their perceived level of engagement with the music for each presentation mode. Additionally, the presentation mode had a significant within-subjects \( (p < .001) \) and between-subjects \( (p < .001) \) on participants’ perceived level of engagement with the music. After completing a pairwise comparison of the estimated
populations means between participants’ ratings of level of engagement for each presentation mode, I found that there were significant differences between the means of the audio-only recording and live performance presentation modes \((p < .001)\) and the audio-visual recording and live performance presentation modes \((p < .001)\). There was not a significant difference between the audio-only and audio-visual presentation mode. Based on my analysis of the data, presentation mode was a significant predictor of participants’ perceived level of engagement with the music for each listening experience.

After completing analysis of the data for question 3, I analyzed the data controlling for participants’ age, gender, and years of musical training and their interaction with participants’ ratings of their perceived level of engagement with the music during each choral performance. Although there were differences between participants’ ratings of their level of engagement with each performance for each presentation mode, there were no significant main effects of the independent variables on participants’ ratings of quality. There were no significant within-subjects effects of the independent variables on individual participants’ ratings of perceived level of engagement. Participants’ years of previous musical training did have a significant between-subjects effect \((p < .05)\) on individual participants’ perceived level of engagement with the music during each choral performance when presentation mode was changed. The effect size was moderate \((\eta_p^2 = .109)\). Neither age, gender, nor any combination of the independent variables, had any significant within-subjects or between-subjects effects on participants’ ratings of engagement with each choral performance.
Based on the results of my analysis of the data, presentation mode appears to have a significant effect on participants’ ratings on the quality of a choral performance and participants’ perceived level of engagement with the music. Although age had a significant within-subjects effect on participants’ rating of quality and years of musical training had a significant between-subjects effect on participants’ level of engagement, age, gender, and years of musical training did not have any significant interactions on participants’ ratings. Moreover, to understand more about why these differences between quality and engagement for each presentation mode were observed, I collected qualitative data from each participant explaining their ratings in their own words. To better understand this phenomenon, I have presented the qualitative results in Chapter 5.
CHAPTER 5
Presentation of Qualitative Results

In addition to quantitative data, qualitative data were collected to further understand the phenomenon of how presentation mode affects students' perception of quality and engagement with music during a choral performance using three different presentation modes. The data collected were written statements provided by the participants explaining each of their quality and engagement ratings that were analyzed and discussed in Chapter 4. Participants’ written responses were transcribed, coded, and analyzed using QDAMiner Lite software (Provallis Research, 2012, version 1.0.2). The codes were analyzed for frequency of use and major themes were identified. After the data were coded, several participants volunteered to participate in a member-checking process.

Qualitative Research, Trustworthiness, and Reliability

The trustworthiness of the data collection has been analyzed to ensure validity for this study. The validity of the study may be limited due to the short amount of time the data collection took place and because data were only collected from each participant once. Regardless of the length of time used for the study, validity should always be established. Member-checking of data was used following transcription and coding of participants’ hand-written responses. The member-check focus group meeting was also transcribed and analyzed. Thick description of observed events and use of narrative when appropriate have also been used. Finally, clarification of any researcher bias is also important to establish trustworthiness of the data. I have provided bias clarification in the
following section.

**Statement of Researcher Biases**

Bias can impede research and data collection because my own subjectivity may interfere with analysis of the data (Glesne, 2011, p. 49). Before embarking on my analysis of the qualitative data, I must admit and clarify some bias. The purpose of bias clarification is to reveal both my own biases and how I will monitor it throughout my data analysis (Glesne, 2011, p. 49). Because of my roles as observer and interviewer, my observations will be influenced by my own views and beliefs. My analysis and subsequent interpretation of the data have been influenced by several things. First, I have previously taught the course from which the population and sample of participants had been drawn. I have purposefully not taught the course during the quarter when data were being collected. Second, although the participants in the courses where data collection took place were not students in a course that I was teaching at the time of data collection, several of the participants had been previously enrolled in other, unrelated courses in a previous school year. Furthermore, some of the participants may have or stated that they had previously heard the choir used for the live presentation or knew of them by reputation. The choir used to prepare the audio-only, audio-visual, and present the live choral performance was from Linn-Benton Community College. Linn-Benton Community College was one of the data collection sites. Because of the live choir’s reputation with the population being studied, I must admit that some of data collected may have been influenced by extant bias established prior to the beginning of this study. Third, having previously taught the course and population being studied, I do have some
bias based on anecdotal evidence from my own teaching experiences surrounding the effects of presentation mode on community college students' perceptions of quality and level of engagement. Prior to this study, my experiences as a music appreciation instructor at a community college have informed my worldview about how students react to music presented using different presentation modes. I believe that (a) listening to music is a subjective experience unique to each individual student; (b) students prefer different presentation modes for listening to music especially when engaged in either active or passive listening; and, (c) students' use of technology may have influence over how engaged they feel when listening to music. Finally, I also believe that every student receiving a music education should be able to experience music in a variety of different ways and that one of my roles as a music educator is to provide students opportunities to listen to music in different ways. Because of this, I believe that presentation mode may affect how students perceive and experience music beyond the music appreciation classroom. Therefore, limiting my teaching during the time of data collection so that my own teaching methods are not influential on participants in the study was important to limit influences of my own biases on participants. Additionally, during the data analysis I tried to monitor my biases so that they did not influence my interpretation of the data collected.

The Choir and Data Collection

For data collection at each site, the audio-only listening experience was the first presentation mode used (see Data Collection in Chapter 3 and Figure 3). Participants listened to an audio-only recording of the English madrigal “Now is the Month of
Maying." Second, participants watched an audio-visual recording of the English madrigal “Come Again, Sweet Love Doth Now Invite.” The live performance listening experience was the last presentation mode used. Participants watched a choir of 34 singers perform the English madrigal “Pastime with Good Company.” The choir was a mixed choir of men and women and performed in a mixed formation of four rows in the classrooms where data collection took place. The choir was all freshmen and sophomore students at the community college where I teach. I rehearsed the choir prior to data collection to prepare the audio-only and audio-visual performances previously described. As in the other performances, the choir was dressed in their regular concert attire. Female choir members were in black formal dresses with short sleeves and male choir members were dressed in black tuxedos with white tuxedo shirts and black bowties. I conducted the choir during both the audio-only and audio-visual recordings. I also conducted the choir during their live performance, which may have also biased participant responses. After listening to each performance, participants were asked to rate the quality and level of engagement with the music. Following the completion of the ratings, participants were asked to write a brief description in their own words describing their reasons for their ratings for each listening experience.

**Researcher Observations during Data Collection**

During the data collection process for the audio-only listening experience, I observed several things. At each data collection site I followed the same protocols reading directions from a script approved by the Institutional Review Board of Boston University. After reading the directions and completing the demographic data, the audio-
only recorded choral performance was played for participants at each data collection site. At all of the locations, my first observation was that none of the participants asked any clarifying questions to the directions. This actually surprised me. I was ready to answer clarifying questions, especially regarding the definition of engagement, but none were asked. During the data collection process at location one, I noted that many of the participants looked down at the data collection instrument. Many had very little facial expression. The only way that I can describe them was almost lethargic. While the audio-only recording was playing, one male participant did start tapping their foot to the beat of the song. Other participants, mostly female, started to tap their pens or pencils to the beat during the first verse. Most of the participants’ action stopped by the time the third verse was being performed.

At the second data collection site, once the audio-only recorded performance was being played almost every participant’s head went down looking at the data collection form. Very few participants looked up. One female participant seated in the back of the room looked around the room, almost as if they were engaged in a passive listening experience. A few participants who were looking up had expressions that seemed to indicate focus. One of the participants, a male who appeared to be slightly older than many of the other students, focused straight ahead of him. His facial expression changed at different times. The focus of his eyes facing forward changed about halfway through the piece and he began to write something on his data collection form. Most of the other participants waited until the audio-only recorded performance was finished before they wrote anything on the data collection form.
At the third data collection site, participants appeared to have more physical reactions to the audio-only recorded performance than at the other two data collection sites. In addition to some instances of foot tapping, or tapping a writing instrument to the beat, there were additional physical reactions. A female participant had the most physical reaction of any participant. I noticed her facial expressions throughout the playing of the audio-only recording. Her eyebrows were raising and lowering very similar to the rise and fall of the melodic line of the piece. The participant’s facial expression changed when the “fa, la, la” sections started and her upper body moved as if to almost dance in her chair. Another female participant seated next to her moved her upper body with the first female participant on subsequent repetitions of the “fa, la, la” sections. I noticed that a few of the participants closed their eyes while listening to the audio-only recorded choral performance at the third data collection site. This may have been due to the fact that there was not a visual stimulus during this listening experience.

In addition to the participants, it is also important to note a single observation made about the instructors of each of the classes where data collection took place. At all three data collection sites, the instructors introduced me to the participants and then sat to the side. The instructors did not have any interaction with the participants during the data collection process. This was not due to any request that I made prior to or during the process.

I observed several things that were different from the audio-only listening experience during the audio-visual listening experience. After all participants had completed their written responses for the audio-only recorded listening experience, I
asked them to turn to the next page of the data collection instrument. At each data
collection site I followed the same protocols reading directions from a script to introduce
the next listening experience. Again, at all of the locations, my first observation was that
none of the participants asked any clarifying questions to the directions. During the data
collection process at location one, I noted that many of the participants immediately
looked up in what seemed to be anticipation of the visual stimulus. Several participants
sighed, almost as if they might be bored.

A few participants sat up in their chairs at when the audio-visual performance
began. Was this a sign of a change in their level of engagement or increased interest in
this recording? One of the female participants appeared to smile more during the
performance. Another participant, a male, had his eyebrows raised with a look of what I
can only describe as confusion on his face. I wondered what the participant was reacting
to and what was influencing the reaction.

At the second data collection site, once the audio-visual recorded performance
began, participant’s again looked up so that they could watch the performance. I did
notice that when the verses started to repeat, several of the participants began to look
away from the visual stimulus and just listen. A younger female participant in the front of
the room was moving her pen to the beat of the music, almost as if she was conducting. A
male participant who appeared to be somewhat older reached over as if to ask the female
participant to stop moving her hand and pen, which she did. Another male participant in
the middle of the room sat back in his chair in a relaxed position with his arms folded.
After the first verse, the participant closed his eyes. I wasn’t sure if he was bored,
sleeping, or trying to listen without watch the visual portion of the performance. None of the participants began writing until the performance was completed.

At the third data collection site, participants appeared to focus on the visual part of the performance. Several participants did not wait until the end of the performance to begin writing written responses to what they were experiencing. I noticed several participants writing and looking up from time to time while listening. Were these participants able to actively listen to the performance while writing their responses at the same time? Although there was a visual stimulus during this listening experience, I again noticed that several participants closed their eyes at some point during the performance. A female participant laid her head down on her desk for the last verse of the performance. I wondered if the audio or visual stimuli affected the participants' ability to pay attention or influenced what influenced their focus of attention. An analysis of the written responses would be the only way I would understand any of these reactions.

After completing the audio-only and audio-visual listening experiences, I observed changes in the reactions from participants during the live choral performance. At the first presentation site, I noticed that when the live choir got into position in front of the participants that participants' posture changed. Before, many of the participants were slouched in their chairs though some sat up a little for the audio-visual presentation. When the choir got into performance position in front of the participants for the live presentation, almost all of the participants sat up. I noticed a similar change in posture at the second and third data collections sites. At the third data collection site, not only did the participants sit up, but many leaned forward and appeared very attentive to what was
going on in front of them.

At all three data collection sites, participants applauded at the end of the performance of the live choir but did not applaud for the audio-only or audio-visual presentations. I wondered if this might have been due to what participants may have inferred based on typical audience and performer interaction where the audience applauds at the end of a live performance to show their appreciation to the performers but was not done for the other presentations because live performers were not present. I also wondered if this was a result of participants’ perceptions of the quality and their engagement with the performance. The only way to address this required analysis of the participants’ written responses.

**Participants’ Written Responses about Quality**

After rating the quality of the performance during each listening experience, participants wrote responses (see Appendix B) explaining their rating of the quality of each *a cappella* choral performance in their own words. The written responses were then coded and analyzed (see Appendix C for the coding categories).

**Audio-only.** Participants written responses about the quality of the audio-only recorded *a cappella* choral performance were extremely varied and interesting (see Figure 12). Many of the responses began with some type of general commentary about the quality of the performance. For example, one participant stated “the music was good.” Another participant wrote “the choir sang very well.” Other participants wrote similar responses including, “sounded great,” “the quality was good,” and, “I can’t imagine it being done any better. It sounded great.” While the generally positive comments (n = 41)
seemed to be appreciative, several students did have negative responses \( n = 3 \). One participant wrote, “it wasn’t great.” Another participant wrote that “the quality of the recording seems iffy.” Though both positive and negative general comments were made, most of the participants either preceded or followed the general comment with something more specific.

Figure 12. Quality of audio-only written response code frequency.

In addition to the general comments, many participants commented on different aspects of the music that influenced their rating of the overall quality. Participants commented on the range of the vocal parts \( n = 4 \), harmony \( n = 5 \), rhythm \( n = 6 \), dynamic contrast \( n = 14 \), intonation \( n = 18 \), tone quality \( n = 10 \), and balance and
blend \((n = 17)\). For example, one participant commented that “I felt the women were more out front and overpowered the lower voices.” Another participant stated, “I enjoy the contrast in dynamics.” There were 18 comments, both positive and negative. A participant wrote that they “didn’t hear anyone singing out of key,” and another wrote that “I almost gave a 4 but the intonation wasn’t the best.”

Some participants were influenced by the sense of togetherness, specifically entrances and releases \((n = 3)\). One participant commented that “entrances and releases were together,” while another commented that the “cut off of some notes wasn’t the most clean.” Other participants commented on togetherness \((n = 11)\) related to being “in sync.” “The a cappella is very in sync” stated one participant. Several participants stated that the singers “were all together.”

Although some participants commented on the influence of different aspects of the music itself and togetherness, participants also commented on other factors. Other factors that participants commented on as influencing their perception of quality included acoustics of the physical environment while listening \((n = 5)\), the physical environment itself \((n = 1)\), association with a life event \((n = 2)\), the sound clarity \((n = 16)\), the technology \((n = 10)\), the quality of the voices/singing specifically \((n = 22)\), engagement level affected quality \((n = 4)\), and emotional expressiveness \((n = 6)\). One participant wrote that “the overall sound was clear,” but another wrote that “the sound system didn’t handle the high notes great.” Another participant noted that “any discrepancies in sound may well be contributed to the room.” Interestingly, two participants related the listening experience to passive listening experiences outside of the classroom. One participant
commented that “I normally have music similar to this in the background in my home when I am cleaning or doing housework.” Another participant noted that the piece “reminds me of Thanksgiving/Christmas.”

As previously mentioned, the lack of technology was also the focus of some of the participants’ written responses. Participants were informed prior to the listening experience that the recording had not been edited or mastered in any way. One participant commented that “with some editing [it] could be even better.” Another participant stated that “the sound wasn’t very clear and pure. [It] was somewhat muffled.” In addition to the lack of technology, several participants commented on how their level of engagement affected their perception of quality.

Participants noted the lack of a visual component during the audio-only recorded choral performance (n = 3). Several participants noted that the lack of a visual component affected their level of engagement impacting their perception of quality. One participant stated, “I’m not interacting with it.” Another participant noted that “it did not fully get my attention.” This also may have been due to emotional reactions/expressiveness perceived by the participants. “Emotionally I found myself trying to envision the people singing,” commented one participant. Another participant stated that “it is not as interesting if you cannot see the choir,” and another stated that “I didn’t get the whole experience listening to it on a recording.” Based on these comments, there appears to be some indication of preference for presentation modes that began to be present in participants’ comments even during the first listening experience.

Finally, diction appeared to have an important influence on participants’
perception of the quality of the audio-only recorded choral performance. Several participants felt that the quality of the ensemble’s diction was good ($n = 6$). “Excellent, clear diction,” wrote one participant. Another participant wrote that “articulation and enunciation were all clear.” Other participants wrote that they scored the quality lower because of poor diction ($n = 5$). Several participants noted that there were times while listening that they could not understand the words. Specifically, one participant noted that “the syllables got muddy at times,” and another stated that “the choir seemed to have a little trouble saying the words together.”

**Audio-visual.** A clear difference between participants’ written responses about the quality of the audio-visual compared to the audio-only listening experience was the increased number of comments regarding the quality of performance and the inclusion of a visual stimulus (see Figure 13). Additionally, many of the participants commented on the quality of the audio-visual recording and not the choral performance they experienced (Audio, $n = 16$; Video, $n = 25$). Although participants did focus on the music and its performance specifically regarding their reasoning for assigning a particular quality rating, many participants commented on other influences as being their primary focus of attention (total $n = 129$). The quality of the visual stimulus during the audio-visual recorded listening experience appears to have contributed to the participants’ perception of the quality of the performance.

Because of the cross-modal stimuli used in the audio-visual recording, participants commented on both the audio and visual quality of the listening experience. Several participants commented that the audio component of the audio-visual
Figure 13. Quality of audio-visual written response code frequency

performance “sounded live” and that the “chorus sounded great.” One participant noted that the “recording was not as quality as the first” yet another participant noted that “the sound quality sounded better, more pure.” The recording of the choir was completed using a Canon Mini-DV Camcorder on a stationary tripod using the camera’s microphone. Based on the participants’ comments it appears that the technology may have been a contributing factor to their perception of the quality of the performance.

Although sound quality was noted by some participants, the visual component received more comments. The visual stimulus was a stationary picture of the choir performing “Come Again, Sweet Love Doth Now Invite.” There was no movement of the
camera or panning in and out from the choir. One participant noted that “the lack of camera work was terrible and distracted from the performance.” Another participant commented that “the video was blurry” while another stated that “the poor audio/video quality takes away from the performance.” As I read these comments, I wondered if the lack of movement, mastering, and editing may have contributed to the perception of decreased quality. With the inclusion of the visual stimulus, one participant noted that “there seemed to be something lacking,” while another noted that they “didn’t feel the same like when listen[ing] to a song on a video.” Participants seemed far more critical of the visual stimulus than I had anticipated. Moreover, the criticism of the visual part of the audio-visual performance was seen across all age groups.

Participants commented both on many different factors of the performance as having affected their perception of the quality of the performance. Participants commented about balance and blend \( (n = 5) \), intonation \( (n = 7) \), melody \( (n = 4) \), and rhythm \( (n = 11) \). Dynamic contrast \( (n = 4) \) appeared to be influential to participants’ perception of quality. There were no positive comments about dynamics in the audio-visual recording. Participants stated that the “lack of dynamic contrast leaves much to be desired” and the choir “could have made the dynamics more obvious.” Diction also appeared to be an important factor in participants’ perception of quality of the audio-visual performance. There were no positive comments about the diction in the audio-visual performance, only negative comments \( (n = 11) \). Comments about the diction included:

- “Sometimes consonants felt late or scattered.”
• “Sloppy diction.”
• “Vowels were not clear.”
• “What are they saying?”
• “I didn’t understand a word they were saying.”

Participants could both see and hear the audio-visual performance; however, many seemed to have a difficult time understanding the words which may have had an effect on their perception of the quality of the performance. Additionally, the quality of the playback system and the acoustics of the different spaces where I conducted the study could have created some of these issues.

Other attributes of the performance that participants focused on included the technology and quality of the stimulus, which I previously noted. Additionally, one participant noted that the choir “could have followed the director more.” Others commented that their level of engagement was affecting their perception of quality \( n = 7 \). For example, one participant stated that they “got lost in the sea of voices” while another stated that “it didn’t draw me in.” Participants commented about feeling lost or bored. In contrast, several participants commented that the addition of the visual stimulus made them feel more connected to the performance increasing their perception of quality. One participant wrote that because of the visual component, “we get to see the singers’ movement.” Another stated that “it helped being able to visually see the performance.”

Based on the participants’ comments it is clear that there were very different views about the quality of the audio-visual recorded choral performance. Although there were both positive and negative comments, there was a clear increase in negative
comments versus positive ones (see Table 17). The addition of the visual stimulus in addition to the perceptions about the technology may have had a negative impact for some participants while others appreciated being able to have something to look at.

Table 17

*Comparison of General Positive and Negative Comments*

<table>
<thead>
<tr>
<th>Presentation Mode</th>
<th>General Positive</th>
<th>General Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio-only (AO)</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>Audio-visual (AV)</td>
<td>30</td>
<td>8</td>
</tr>
</tbody>
</table>

**Live performance.** When analyzing participants’ written responses about the live performance, I noted an increase in the number of comments regarding the physical environment where the listening experience took place. The number of general positive comments (n = 33) increased for the live performance and there were no general negative comments. Many of the participants commented on balance and blend (n = 14), intonation (n = 10), harmony (n = 4), and diction (n = 11; there were no negative diction comments). Moreover, the number of comments about other factors increased, especially comments about the singers themselves (Look, n = 2; Facial expression, n = 1; Interaction, n = 6; Connected, n = 8; Emotional expressiveness, n = 7). Several of the participants commented on how the lack of technology affected their perception of the quality of the live performance (n = 11). Similar to the other presentation modes, there appeared to be many different factors that affected participants’ perception of quality during the live performance.
Figure 14. Quality of live performance written response code frequency.

After the live performance, many participants commented on how the physical environment where the performance took place had an effect on their perception of the quality of the performance. Most of the comments about the physical environment were due to the change in acoustics ($n = 9$) because of the live presence of the choir, and the participants' proximity to the choir.

Several comments about the difference in acoustics during the live performance included:

- "It created a surround sound since it was live."
• "The acoustics provided by the live aspect made it more full sounding."
• "I could hear very well how it went together."
• "The live choir had a very full sound and the best choir presented."
• "I could hear the vibrations come out and actually feel entranced."

The presence of the actual choir performing in front of the participants in the same room appeared to affect participants' perceptions of quality ($n = 5$). The acoustical change appeared to be important to several participants. Because of the physical presence of the choir in front of the participants, the change in proximity had an effect on some participants' perceptions of quality. One participant stated that they felt that they "rated it higher just because of the presence of the choir and lively sound that they produced."

Because of this statement, I contemplated if the presence of the live choir in the room made the live performance seem more real to the participants. Because of the proximity and acoustical change during the live performance, there appeared to be clear differences in the reasons for participants' ratings of quality.

In addition to participants' comments about the physical environment, I noticed that many participants focused their attention on attributes of the music itself as reasons for their ratings of the overall quality of the performance. Participants commented on the ensemble's balance and blend, intonation, use of harmony, diction, and dynamics ($n = 20$). What was very interesting to see was that none of the comments had a negative tone. In fact, comments were much more positive when compared to those of the other two presentation modes (see Table 18).
Table 18

Sample Comments about Music in the Live Performance

<table>
<thead>
<tr>
<th>Balance/Blend</th>
<th>Dynamics</th>
<th>Intonation</th>
<th>Harmony</th>
<th>Diction</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n = 14$</td>
<td>$n = 20$</td>
<td>$n = 10$</td>
<td>$n = 4$</td>
<td>$n = 11$</td>
</tr>
</tbody>
</table>

- “Excellent balance between sections.”
- “Dynamics were done noticeably and together.”
- “The intonation was spot on.”
- “Great use of harmonization.”
- “It was much clearer and I could really understand what they were saying.”
- “The voices all blended together.”
- “The dynamic contrast and words were clearest in this performance.”
- “Intonation was great.”
- “The chords really seemed to lock into place.”
- “Could understand the words they were singing.”
- “It was amazing how well each section blended.”
- “They transitioned from loud to soft very effortlessly.”
- “Everything was in tune.”
- “Nice harmonization. Everyone was really listening to each other.”
- “I chose the rating above because the voices were clearer and I could understand every word.”

I found it intriguing that, although the same choir was used, participants appeared to notice an increase in dynamic contrast more for the live performance. The attention to dynamic contrast in the live performance could have been due to the fact that they were not listening through any type of technology. Similar to the dynamics, participants appeared to understand the words of the piece for the live performance better than either of the pieces where technology was used for the listening experience. There was a difference in participants’ perception of different attributes of the performance during the live performance that appeared to affect their perception of quality.
Participants also commented on the influence of factors other than the music itself on their perception of quality. The lack of technology was one of the first things that I noticed participants commented about. One participant stated that the live performance "circumvented issues of audio equipment," and another stated that the live performance "was much better because there was no video or recording." For some participants the lack of technology enhanced the performance as evidenced in another comment where a participant stated, "I felt that I perceived more about the performance more than I did in a non-live environment."

Although the lack of technology was important to some participants, other factors also appeared to affect participants' quality ratings. Participants commented on the perceived skill level of the singers \((n = 18)\), which was interesting because the same singers performed all three pieces. For the live performance, participants stated that the singers "sounded extremely rehearsed" and "are very great and skilled." Some participants commented on the singers' energy and emotional expressiveness. "The energy of the singers really showed," said one participant. Another stated that "I felt the song come to life" while another stated that "everyone took it seriously." Other participants noticed interaction \((n = 6)\) between the singers as having an effect on their rating of quality. A participant stated that "it is very interesting how they work together." The participants' ability to see the singers in a live performance appears to have had some influence on their perception of quality.

Considering the participants' comments about the quality of the live performance, there were some very clear differences between their comments for the live presentation.
mode compared to comments about the audio-only and audio-visual presentation modes. The presence or lack of technology was a factor for some participants’ when considering the quality of the performance. Other factors, including the singers themselves, also had some influence about participants’ perception of quality. Environmental factors including the space and other people appeared to have influence because of the change in proximity to the performers and acoustical differences. There were clearly many different factors that influenced participants’ perceptions of quality.

**Participants’ Written Responses about Engagement**

After rating their self-perceived level of engagement with the music during each listening experience, participants wrote responses (see Appendix B) explaining their level of engagement for each *a cappella* choral performance in their own words. The written responses were then coded and analyzed (see Appendix C for the coding categories).

**Audio-only.** Many participants commented on issues of quality having an effect on their level of engagement (*n* = 12; see Figure 15). The presence or lack of affective responses (emotional or physical) was noted by some participants. Other participants commented on the lack of a visual stimulus to keep their attention. Moreover, several participants noted issues with the environment (*n* = 13) having an effect on their level of engagement with the music during the listening exercise. Based on participants’ comments, there appear to be many different factors that may affect participants’ level of engagement when listening to music using an audio-only recorded presentation mode.
Figure 15. Engagement with audio-only performance written response code frequency.

Many participants commented on the quality of the performance affecting their level of engagement with the music during the audio-only recorded choral performance. The quality of the singers' diction appeared to affect several participants' \((n = 9)\) level of engagement. One participant wrote that, “even though the piece was in English, it was hard to understand what the lyrics were. I felt a little disengaged.” Another commented that they “couldn’t understand a lot of the words so it doesn’t quite capture my attention 100%.” Contrarily, another participant commented that “even though the audio was not mastered, it sounded intriguing which caught my attention to listen to the words.”
addition to diction, dynamic contrast was also noted by some participants \( (n = 5) \). “It was engaging but lost some interest as it repeated itself with little or no dynamic change.” Another participant commented that “the use of dynamics keeps the audience actively listening.” Additionally, factors including repetition of the melody \( (n = 8) \) and the repertoire \( (n = 6) \). For example, one participant stated that “the style isn’t my absolute favorite, and yes it sounded a bit canned.” Another stated that “I appreciate this music; however, it is not something I would listen to on my own time.” Overall, the music itself in addition to other factors related to the quality of performance appeared to have some effect on participants’ level of engagement.

In addition to comments about the music itself, participants \( (n = 49) \) commented that the lack of a visual stimulus affected their perceived level of engagement. For example, one participant noted that “having no visual component increases focus on audio.” Another noted that the performance was “well done, but like listening to the radio.” Other comments included:

- “It’s just a recording of a choir. I can’t see anybody or make personal, visual connections to them.”
- “Because there were no additional stimuli, I was forced to pay closer attention to what I was listening to.”
- “Where should I look? Listening only left me feeling distracted.”
- “Without a visual reference, it was more difficult to stay focused as the melodies were repeating.”

The lack of a visual component appeared to have both positive and negative effects on
participants’ level of engagement. Moreover, I noticed that many participants commented on their preference for presentation mode due to the lack of a visual experience.

Although the audio-only recording was the first of the three presentation modes that participants experienced, several \( n = 12 \) stated preference for a presentation mode as a reason for their lack of engagement. This was very interesting because preference for presentation mode was not a question asked of the participants. Comments about preference for the presentation mode during the audio-only listening experience included:

- “It was a recording, so I wasn’t engaged as if it was live.”
- “Visualization and live performance is easier to be engaged with.”
- “I felt mildly engaged, although I prefer a visual performance with a live recording.”
- “I was attentive because of the study and engaged because I enjoy music but it doesn’t have the same draw or engagement as a live performance.”

It appears that the lack of a visual stimulus affected participants’ level of engagement to actively listen to the music if it were not a requirement of the study. Many of the participants stated that not only was the lack of a visual stimulus affecting their level of engagement, but that the use of a recorded, non-live performance was less engaging.

The physical environment (classroom, \( n = 4 \); proximity, \( n = 1 \); technology, \( n = 8 \)) was also a factor that affected some participants’ level of engagement. Although each data collection site was somewhat different, each was a regular classroom that all of the participants were familiar with. One participant commented that “because it wasn’t a live performance, the aesthetics of the classroom were distracting.” Another participant noted
that they “felt like the choir could be in the room. It seemed like I could be a part of it.”

These comments in conjunction with my own observations appeared to confirm that some participants may have had a hard time focusing on the music due to distractions in the physical environment and the lack of a visual stimulus.

**Audio-visual.** The majority of participants wrote responses in which the participants’ focus of attention appeared to be on factors other than the music itself. Several participants \( n = 2 \) commented on the facial and emotional expression of the singers. Other participants mentioned feeling either more connected \( n = 4 \) or disconnected \( n = 14 \) to the music even with the addition of a visual stimulus. Some participants mentioned that the perceived quality of the performance had a positive \( n = 4 \) or negative \( n = 9 \) influence on their level of engagement. Twelve of the participants mentioned a specific preference for a performance or presentation over another one as having some influence on how engaged they felt with the music while listening. Thirty participants commented on how the technology was influential in their perceived level of engagement during the audio-visual choral performance. What was most interesting was that many of the participants commented that they felt less engaged with the music for some reason even with the addition of the visual stimulus.
Because the participants could see the singers performing in the audio-visual choral performance, several participants commented on the appearance of the singers, specifically the presence or lack of facial expression. Comments about the singers' facial expressions included:

- "Expression on faces would have been nice."
- "The visual aspect lets me see the emotion on the singers' faces."
- "I was actively watching them sing and trying to place their voices with their faces."

Figure 16. Engagement with audio-visual performance written response code frequency.
Based on these comments, the facial expression of the singers appeared to have an impact on how engaged participants felt with the music. Additionally, the perceived engagement of the singers themselves also may have influenced participants’ \( n = 5 \) level of engagement. For example, a participant commented that “there was only one woman who actively engaged the audience.” Another participant stated that they weren’t “completely engaged, because there wasn’t much going on in the performance.” I wondered if the participants’ observations about lack engagement between the singers made the participants feel disconnected with the music. It is plausible that the perceived level of engagement of the singers influenced the connectivity between the listener-viewer and the performer during the audio-visual presentation.

There were clearly more participants that felt extremely disconnected \( n = 14 \) with the audio-visual recorded performance than participants that that felt connected \( n = 4 \) after reviewing participants’ written responses. One participant noted that they felt “more engaged than with the last one. There was something to watch.” Another participant stated that “it’s a little more engaging because you get to watch something while listening.” The addition of a visual stimulus appeared to make some participants feel more engaged with the music. More participants felt less engaged and more disconnected with the music. Participants stated that:

- “I focused on the audio because it was easy to get distracted by the video.”
- “Still rather impersonal because of the quality of picture and sound.”
- “I was engaged only for the fact that I was judging them.”
• “The sound quality was decent but the visual was poor. It would have been better with eyes closed.”
• “The picture was blurry. Camera shot could have been closer, more creative and involved.”
• “It’s a little difficult to feel engaged while watching a video. It doesn’t feel like I am there.”

Although a visual stimulus was present in the audio-visual presentation mode, and many participants also commented that the lack of a visual stimulus was a negative influence on engagement level in the audio-only presentation, the added visual stimulus did not seem to have a positive impact for some participants. It was interesting to see that there appeared to be a link between participants’ negative reactions to the visual stimulus and that the perceived overall quality of the performance negatively impacted participants’ level of engagement.

Several participants commented that the overall quality of the performance was the reason for their lower level of engagement. Many of these participants mentioned the presence, lack of, or quality of the visual stimulus as part of their perception of the quality of the performance and its relationship to their engagement level. Specifically, one participant stated that the audio-visual presentation “was a little more engaging due to the visual aspect of the video but still felt a tad bit dry.” Another participant stated that the quality wasn’t good and therefore they felt less engaged because they “found it more distracting to have a visual. It made it hard to focus. I felt like I was in church.” A third participant noted that they were “distracted by the audio-visual and it was hard to engage
at all with the performance.” Based on these participants’ comments, the participants’ perception of the quality of the performance appears to have some influence on their level of engagement—positive or negative—with the music.

Additionally, participants \((n = 12)\) commented about their preference for a particular presentation mode in their comments about their level of engagement. Many of the comments about preference mentioned the visual stimulus. Participants stated that:

- “In a performance I like to be able to direct where I am looking, so I didn’t like the lack of camera work.”
- It was “a bit more engaging since there was a visual reference, but would have been better as a live performance.”
- “In comparison the first presentation, I felt more engaged in this one due to the visual aide.”
- “This was better than just listening. It was nice to have somewhere to look.”

Some participants preferred the audio-visual presentation mode over the audio-only presentation mode because they seemed to enjoy having somewhere to look and to focus their attention both visually and aurally.

Many participants \((42\%, n = 30)\) commented about how the technology (the recording itself) had an effect on their perceived level of engagement. The technology included how the performance was recorded and the playback technology that was used to present the audio-visual choral performance to the participants. One participant stated that “the lack of camera work made me not want to watch, but just listen.” Another participant stated that “the video was not recorded well with a bad recording device, but
the audio was great but the video was distracting.” Contrary to these participants’
comments, a participant stated that “it was a very clean recording to see and hear while
listening” and another stated that “the video was good, but the lag was a distraction.” The
quality of the recording itself seemed to have an effect on participants’ ability to engage
with the music while listening. Comments about poor video and sound quality were
common; however, some participants felt that the video and audio quality were clean and
clear. Perhaps the quality of the technology used for the recording affects listeners’
perceptions of a performance, specifically their ability to feel engaged with the music
while listening. Moreover, the use of a stationary camera rather than multiple camera
angels and movement seemed to be an important issue for many of the participants. If the
camera had moved around and felt more natural such as in a television show, music
video, or video game, participants may have been more enthusiastic about the audio-
visual recorded performance. As a result, it appears that the perceived quality of the
recording itself may have drawn participants’ focus of attention away from the music to
focusing on the technology.

Based on participants’ comments, there were a number of different factors that
may have positively or negatively influence participants’ perceived level of engagement
with the audio-visual choral performance. For both the audio-only and audio-visual
performances, the technology was considered by some participants to have been an
influence on their level of engagement. Some participants had affective or cognitive
responses that influenced their perceived level of engagement. It is important to consider
the final presentation mode, live performance, because technology was not a factor.
Live performance. Participants commented that a variety of different factors affected their level of engagement. Many participants commented about factors of the live performance other than the music itself that affected engagement. Similar to the other presentations, many participants \( (n = 28) \) stated a preference for a presentation mode, specifically the live presentation mode, as part of their comments about their level of engagement. Many participants described a connection with the music \( (n = 21) \) and the singers \( (n = 10) \) during the live performance.

![Figure 17. Engagement with live performance written response code frequency.](image-url)
Factors that affected participants’ perception of their level of engagement with the music during the live performance included balance and blend \((n = 4)\), dynamics \((n = 2)\), diction \((n = 3)\), and tone quality \((n = 3)\). The number of comments about the music itself was lower for engagement with the music during the live performance compared to other factors. A participant commented that the choir’s “sound blended pretty effectively and I found myself captured by their performance.” Another participant stated that “the actual sound and tone quality” was the reason for their identified level of engagement. Additionally, a participant commented that the performance was “very live in a small room. Each performer could be heard and understood with great dynamics. I was completely engaged.” While these factors had an effect on some participants’ level of engagement, a preponderance of factors other than the music itself seemed to affect many of the participants.

The physical environment was a factor that many participants wrote about. The physical environment included the classroom \((n = 9)\) and the proximity \((n = 24)\) of the singers to the participants. For example, a participant commented that “being in the room with the performers brings a more connected feeling for the audience.” Another participant stated that “I was in the same room a few feet away, so I was definitely engaged.” Other participants also noted their proximity to the performers:

- “It was extremely engaging because everyone was right in front of me.”
- “To be this close to the group and see how focused they are and being able to hear individual voices is really awesome.”
• “I was more engaged again because of their presence of them just standing there rather than just hearing it or viewing it on a recording.”

• “They were a few feet from me. You can’t not be engaged.”

The proximity of the singers to the participants appeared to be an important factor for participants’ level of engagement, especially because the performances took place in their regular classroom. Being in the same room with the performers appeared to affect participants’ affective responses of feeling connected \( (n = 21) \). For example, a participant stated that “live performances are always much more engaging. You can see the vocalists, feel their voices, and connect with them.” Another participant stated that they “felt involved and enveloped in the sound.” There was definitely more of a feeling of being a part of the performance by many of the participants during the live performance than in the other two presentation modes.

In addition to the physical environment and proximity, the presence of the singers themselves influenced some participants’ level of engagement. Participants commented on the singers’ facial expressions \( (n = 10) \) and the singers’ level of engagement \( (n = 11) \) with the music or with each other. Specifically, several participants stated that singers’ “faces were engaging to watch.” One participant stated that they felt a higher level of engagement because they “could see their smiling faces and feel the energy in person,” while another participant stated that “I felt the music and saw the passion in the performers.” Being able to see the singers was important for one participant that stated that “the performance was a lot more interactive and thus more engaging.” The singers themselves appeared to be influential for participants’ level of engagement during the live
Although the physical presence of the singers appeared to be important for participants’ level of engagement, several participants \((n = 28)\) stated a preference for, or some influence of, the specific presentation mode for the final presentation. Comments about the preference for and influence of the live presentation included:

- “It’s live.”
- “Live is always best.”
- “By far the most engaging because of it being live.”
- “Can’t get any better than a live performance!”
- “It was very engaging because it was live.”
- “It was VERY interesting to hear a live performance. Much more entertaining for me than audio-visual or just audio.”
- “A live performance is much more immersive than any recording.”

Some participants stated a preference for live presentation mode before the live performance took place. There may have been some preconceived bias on the part of participants prior to the data collection process. It is important to note that some participants were clearly able to articulate statements of preference for one presentation mode over another even though the issue of preference was not being investigated.

There were definitely many factors that influenced participants’ level of engagement with the live performance. The presence and focus of attention on the singers in the same space as the participants seems to have been an important factor that affected participants’ level of engagement. Moreover, some participants’ clear articulation of a
preference for a presentation mode and their level of engagement is an important consideration when trying to understand participants' comments about engagement during the live choral performance.

Why Participants Rated Quality Differently

After analyzing participants’ written responses and my own observations during the data collection process, five major themes were evident. The themes include: (a) participants’ focus of attention changes with presentation mode; (b) environmental factors influence participants’ perceptions; (c) technology affected participants’ perceptions of quality; (d) participants’ preference affected their perception of quality, and (e) perceptions of performance quality were unique to the individual.

Each theme is evidenced throughout the data and emerged based on the coding of data and were confirmed through a member checking process after data collection and analysis were completed.

Participants’ focus of attention changes with presentation mode. Participants’ focus of attention changed when the presentation mode was changed. During the audio-only recorded performance, participants had many more cognitive responses based on what they heard than they did for the other presentation modes. The cognitive responses included comments about the music itself including intonation, dynamics, balance, and blend. Additionally, participants focused on diction with an equal number of positive and negative responses about participants’ ability to understand the words. When a visual stimulus was added in the audio-visual recorded performance, there was a clear increase in the number of responses about the visual stimulus because the participants had an
identified visual focus.

Although participants commented on the quality of the music in the audio-visual presentation, many of the responses were affective responses that were often linked with the visual part of the performance. Participants commented on the quality of the visual stimulus more as having an effect on their perception of the quality of the performance. Based on participants’ responses, factors including the expression of the singers, the technology used for the presentation and creation of the recording appeared to draw participants’ focus of attention away from the music. Similarly, the focus of attention changed for the live presentation.

Based on the live listening experience, the focus of attention of participants’ comments changed. There was an increase in the number of cognitive responses about the music itself including dynamics, balance, blend, diction, and intonation. There was an increase of positive comments about the visual stimulus. Although a visual stimulus was present in both the audio-visual and the live presentations, the focus of attention of the participants appeared to change. Participants focused on factors including the perceived professionalism, skill level, and expressiveness—especially facial expression—of the singers themselves. For example, a participant stated that “any discrepancies in sound may well be contributed to the room.” Another participant stated that “I enjoy the contrast in dynamics.” As evidenced in participants’ comments, many participants commented on many different factors providing both cognitive and affective responses at the same time during the live presentation.
Environmental factors influence participants’ perceptions. Environmental factors affected participants’ perception of the quality of the different choral performances. In the audio-only recorded performance, many participants commented that they did not know where to look or what to do because there was not a visual focus. Additionally, several participants noted their observations of their peers. For example, one participant stated that during the audio-only performance “I noticed a lot of the class was looking down or around the room during the performance.” From my own observations, I noted that participants were looking around the room or down at their paper during the audio-only recording but they looked up at the audio-visual and live presentations because of the presence of a visual stimulus. The presence of a visual stimulus was a change to the regular classroom environment and appeared to have an effect on some participants’ perceptions of the quality of each of the choral performances.

In the live presentation, environmental factors appeared to have an important impact on participants’ perception of quality. The presence of live choir members who were not a part of their regular class was new to the participants. The singers were in close proximity to the participants also affecting the environment. Moreover, because the performance was a live performance and not presented using any technological means, many participants noted a change in the acoustics due to the environmental changes.

Technology affected participants’ perceptions of quality. The use of technology and participants’ perceptions of the quality of the technology had an impact on many participants’ perceptions of the quality of the performance. During the audio-only performance, one participant commented on the recording speed of the compact disc
used as possibly having a negative effect on the quality of the performance. Some of the participants commented that because of the technology the quality of the audio-only performance was impacted due to the technology's ability to handle the higher range of the soprano voices. Others commented that they believed that one of the reasons that they could not understand the words of the first recording was because of the recording quality negatively affecting their perception of the overall quality of the performance. Similar comments were made during the audio-visual recorded performance.

For the audio-visual performance, participants noted that the quality of the performance was affected by technology. The recording quality appeared to affect participants' perceptions of the performance quality negatively as described for the audio-only performance. The more striking influence of technology is evidenced in participants' comments about the quality of the visual stimulus. Many participants wrote negative comments about the visual stimulus in the audio-visual performance. Participants' commented that there was a lack of camera work, that the lack of camera positions was distracting to some or that they perceived that the level of the camera operator was very low. Others commented that the visual stimulus wasn't clear or pure, and that although there was a visual stimulus, they did not feel connected or a part of the performance. The clarity of the visual stimulus may have been impacted by the playback technology used, which was not under my control. More importantly, it is evident that the technology used for the audio-visual presentation—especially the technology for presenting the visual stimulus—had a negative effect on participants' perceptions of the quality of the performance.
One important theme related to technology was that, for both the audio-only and audio-visual presentations, many participants' commented on a lack of connectedness to the music as having an effect on their perception of the quality. Several participants made general comments of "it was good," or "great job" but noted that they would have perceived the quality of the performance as being higher had they felt like they were a part of it. This was interesting because the idea of feeling connected to the music implies participants' perception of engagement, not quality. The use of technology appears to have had an effect on engagement even before engagement was addressed. Participants' inability to feel connected or engaged with the performance also appears to have had a negative impact on their perception of the quality of the overall performance. This became more evident during the live performance.

During the live performance, the lack of technology appeared to have a positive impact on participants' comments and perceptions about the overall quality of the performance. Contrarily, I do wonder if technology added to the live performance or if different technology had been used for the playback of the audio-only and audio-visual recordings would have had a similar impact on participants' perceptions of quality. The lack of technology, in addition the environmental factors above, was perceived as beneficial when participants listened to the live performance. One participant commented that live performance "circumvented the need and use of technology." Moreover, participants noted that the lack of technology made them feel like they were a part of the performance which is in direct contrast to how the audio-only and audio-visual performances made some of the participants feel. The feeling of connecting with the
ensemble and engaging with the music affected many of the participants in a positive manner. Several participants noted in their comments that they rated the quality higher because they felt like they were a part of the performance and "more into it." Based on the evidence, participants' feeling of engagement, often related to the use or lack of technology during the performance, had some impact on their perceptions of the quality of the performance.

Participants' preference affected their perception of quality. I was surprised to see comments about preference for a presentation mode specifically because there was not a specific question asked of participants about their preference for a presentation mode or performance. Although there was not a specific question about preference, participants seemed inclined to state a preference for a presentation or presentation mode evidenced in their written statements. Several participants stated that they rated the quality of the audio-only presentation lower because it wasn't live and that they did not have a visual stimulus and because the experience seemed to be more passive rather than active. Similarly, for the audio-visual presentation participants noted that they felt they would have rated the quality higher if it would have been live. Several of the participants commented that they preferred the audio-only performance more than the audio-visual performance because of their perceived quality of the visual stimulus.

Contrarily, participants commented that they preferred the live presentation because it was live. The live presentation mode was preferred by some participants because of their observations about the sound quality and environmental factors previously discussed. Some participants commented about their preference for the live
presentation mode throughout the data collection process. For example, one participant’s comments regarding quality focused on their preference for live performance:

Audio-only: “It was a good performance, but nothing special. I always enjoy a performance more if it is live and I can see what is going on. The singers did fine, but I think live is better.”

Audio-visual: “I was glad I could see the performers, but the visuals were distracting. I wasn’t a part of it and so the quality felt off. It wasn’t like I was there with them and I couldn’t tell as much what was going on in the music as I could in a live performance. The performance seemed off, like there was something missing.”

Live: “This was by far my favorite performance. They sounded so good! You could really hear all of the different parts and I could understand what they were saying. I felt like they really knew what they were doing which drew me in. By far the best quality performance of the day.”

The fact that some of the participants had a clear preference for a presentation mode prior to the start of the data collection should be noted. Although I did not tell participants exactly what they would be hearing or seeing, I did inform participants that they would be hearing and seeing a cappella choral performances. The information was contained on the data collection forms and when reading my recruitment script. Participants were willing to state their preferences in their comments without a specific question asked of them during the data collection process. Participants’ preference either before or based on
their experiences during the study had some impact on their perception of the quality of the performances.

**Perceptions of performance quality were unique to the individual.** An additional theme that emerged based on my observations and analysis of participants’ written comments was the perceptions of performance quality are unique to the individual participant. Although major themes were evident throughout the written comments, more importantly I found that the reasons for participants’ ratings of the quality of performance differed in some way from other participants. Each participant had a reason for their rating of the quality of the performance that was unique and related to a variety of different factors. Participants’ comments provided evidence that participants had both cognitive and affective responses to the performances influenced by their own individual perceptions of what they heard.

**Why Participants Feel More or Less Engaged**

I wanted to understand why different presentation modes make students feel more or less engaged with the music, if at all. After analyzing the participants’ written responses and my own observations during the data collection process, four major themes were evident. The themes include (a) specific musical factors influence engagement level; (b) other factors influence engagement level; (c) technology influences engagement level, and (d) perceived quality of performance influences engagement. Each theme is evidenced throughout the data and emerged based on the coding of data and were confirmed through a member checking process after data collection and analysis were completed.
Specific musical factors influence engagement level. Perceptions of different factors in each choral performance influenced participants' perceived level of engagement during each listening experience. Factors included participants' comments about the music itself. Dynamics were the factor that received the most comments from participants. For example, in the audio-only presentation, many participants commented that they felt the dynamics changed, but that dynamic changes were not always clear or performed consistently by the choir making the performance less engaging. One participant wrote that they “lost some interest as it repeated itself with little or no dynamic change.” Another participant stated that they could “hear dynamics, but it sounds like the women are starting dynamic changes before the men.” During the audio-visual presentation, dynamics were not perceived to change at all by many of the participants. A participant stated that “there was no dynamic contrast at all.” In the live presentation, participants commented that the changes in dynamics were clearer, more interesting, and precise drawing them into the performance more. Other musical factors such as intonation, balance, and blend were also noted by participants regarding their perceived level of engagement. Diction was also an important musical influence on participants' perceived level of engagement. Participants commented that their ability to understand the words including pronunciation and the togetherness of both entrances and cutoffs affected their level of engagement with the music.

Generally, if factors about the music itself were perceived as being poor, many participants commented that they felt less engaged. If those same factors were perceived as being good, many participants commented that they felt more engaged. During the
audio-only presentation, participants perceived factors about the music itself as being better than those in the audio-visual presentation and therefore stated that this was a reason that they felt more engaged with the audio-only presentation and less engaged with the audio-visual. As evidenced in participants’ comments, the perception of the quality of the performance during the live presentation was perceived as much higher than in the other two presentation modes. Participants stated that they felt more engaged with the performance when the quality of the performance was perceived as being better.

**Other factors influence engagement level.** Although factors about the music specifically did affect some participants’ perceived level of engagement, other factors of the performances influenced participants’ ability to feel engaged with the music during each listening experience. During the audio-only performance, participants noted that the lack of a visual stimulus (also noted in their perceptions of quality) affected their ability to engage with the music. Participants commented about many factors including the presence of a live choir, the technology used for playback of the audio-only and audio-visual performance, and the singers. For example, participants commented on the professional dress and professionalism of the choir during the live presentation. Participants also commented on the singers’ level of engagement within the choir, with the audience, and facial expression as being reasons why they felt more engaged. During the audio-visual presentation, participants felt less engaged because they perceived the level of professionalism and engagement with the choir as lower and many noted that they felt the choir had less facial expression. Because the participants could see the performers in both the audio-visual and live presentations, the participants’ observations
about what they saw appeared to have a negative influence on their level of engagement during the audio-visual presentation and a positive influence on the level of engagement during the live presentation. The lack of a visual stimulus in the audio-only performance seemed to have both positive and negative influences on the participants' level of engagement. Additionally, several participants noted that their engagement with the music during the audio-only presentation felt forced because there was nothing else to pay attention to.

**Technology influences engagement level.** The use or lack of technology influenced many participants' level of engagement during each musical performance. The quality of the recordings in both the audio-only and audio-visual presentations appeared to have negative influences on participants' ability to engage with the music during both presentations. Many participants perceived the quality of the recording to be fair for the audio-only presentation, though several noted that because they couldn’t hear some aspects of the performance—noting that this may have been due to the technology being used—that they felt less engaged with the music. Participants made similar comments about the audio-visual presentation mode, though the technology appeared to have a larger negative influence, especially because the quality of the visual stimulus was perceived by many as being low.

Interestingly, participants also noted a feeling of connectedness as having been influential in their perceived level of engagement with both the audio-only and audio-visual performances. Many participants stated that they felt separated from the performances because they were not present to hear the performance happen in “real-
time.” For example, during the audio-only presentation, several participants commented that though they felt it sounded acceptable, it was like “listening to the radio” and that they “wouldn’t mind if was turned off.” The performance was keeping the participants’ attention. During the audio-visual presentation participants noted it was like listening to a television show. They felt like they could have been listening to the performance from another room and heard the same thing. One participant stated that they felt that the audio-only and audio-visual listening experiences were less engaging not only because they didn’t feel connected, but that the lack of connection made it feel “passive” and “not active enough for me to really want to listen.” During the live performance, participants commented that it was more engaging because they felt more connected. The presence of the live choir members made the performance seem real for many of the participants. The presence of the live choir and the close proximity to the live choir, and the lack of technology appeared to make participants feel more engaged with the live presentation more than with any other performance.

Perceived quality of performance influences engagement. The perceived quality of each performance influenced many participants’ perceived level of engagement with the music. Based on my observations and analysis of participants’ written statements, many participants felt that if they perceived the quality of the performance as being lower, then their level of engagement was also lowers. If the quality of the performance was perceived as being higher, participants were more likely to perceive their level of engagement as being higher. Many of the participants’ stated that the quality of the live performance was the better presentation of the three choral
performances that they experienced. As a result, many of them noted that because the performance was perceived as being of high quality and better than the other two performances (audio-only and audio-visual) that they felt more engaged with the music. Similarly, many participants perceived the quality of the audio-visual presentation as being of the lowest quality and stated that this was one of the reasons that they perceived that their level of engagement with the music was lower. The quality of the audio-only presentation was perceived by many participants as being higher than the audio-visual and lower than the live presentation mode. Participants commented that because they perceived the overall quality of the audio-only performance as generally good, but nothing spectacular or bad, they tended to rate their engagement with the music of the audio-only presentation somewhere between the other two presentations. Generally, it appears that if a presentation of a performance was perceived as being higher quality regardless of what the presentation mode was, then the higher the participants’ level of engagement as evidenced in their written comments.

**Member Checking Analysis**

The first set of qualitative data that the members reviewed were the participants’ responses about the quality of each choral performance. Member check participants read through the transcripts and compared it with the code list. Member A, a female participant, noted that there were many things that surprised her when reading the participants’ responses about the quality. She stated that “there were a lot of general comments, but many of the specific comments were different from her own reflections about the quality of each performance.” Member C, a male participant, stated, “yeah, it
looks like there were a lot of different ideas about the quality of each performance.”" I asked the members to explain what they meant.

A: “For example, I didn’t even think about the technology itself, but it appears that many people did. I like that you identified technology as having some kind of influence. In my conversations with other peers, many of them did mention the quality of the recordings.”

C: “I agree about the technology being a factor. I definitely could see a difference, but it looks like each person honed in on something different. Others heard one thing whereas some other people heard another. It’s funny how we all experienced the same presentation and heard and focused on something completely different.”

B: “Exactly. I wasn’t expecting to see such varied responses. But it is interesting how the responses changed, yet stayed so completely different in their own ways for each performance.”

The discussion about the variety of responses and codes used continued for about thirty minutes. Members noted that the variety of codes used appeared to accurately reflect what they were seeing.

Me: “Is there anything you see that seems to be missing or wasn’t addressed? Do the codes and themes fit or contrast with your own perceptions of the quality of the different performances?”

E: “You seemed to have captured and identified as much as possible. We all clearly had a different, yet some similar experiences. There were definitely a lot
of different things that affected quality. Perhaps we all think of quality differently.”

B: “I think that is a major point, we all had our own reactions regarding the quality of each performance. I like that you identified that as a theme.”

D: “That’s true, but the music and technology really were important parts of that which came through both in the responses and your themes.”

A: “Yes, but I also think that the room made a big difference. The sound definitely changed with the live choir being in the room, and it really did change the way that I felt about the quality of the performance. You mentioned the acoustics and the environment. That was such an important part of how I perceived the quality. From looking at the transcript, it appears that was definitely important to other people in the classes too.”

C: “I definitely don’t think there is anything missing, but there is much more here than I would have ever thought of. I would have never guessed that this would have been so complex.”

After discussing the data, codes, and themes about the quality of each performance, members of the member check focus group completed the same process to check the data, codes, and themes regarding participants’ level of engagement with the music for each performance. Member B, a male participant, stated that “the influence of the recording quality and technology really seemed to be a factor here.” I replied, “what do you mean?” B stated that “there were a lot of comments about feeling disconnected and that when some people didn’t like the quality of the recording they didn’t feel really
drawn to the music.” Member C agreed stating that “the technology really did affect how much I wanted to listen to the music.” I asked C, “how?” Member C replied that:

Well, when the whole process was over, I remembered that I really liked the live performance, but I couldn’t remember a lot about the other two performances. I didn’t feel like there was anything that really grabbed my attention. Really, I just felt kinda bored. Forcing us to listen to the audio-only performance really made us focus on what we were hearing, but only if we chose to actually listen. There were plenty of other things we could do or in the room that could distract us. I know I had a hard time focusing. The audio-visual presentation I just didn’t like because I didn’t think there was much to watch. It just didn’t do much for me. Then, when the singers were all right there in front of us, it grabbed my attention. I knew they were the same singers from the other two recordings, but then to hear that sound in the room, I just kinda was like “wow” and it made me want to listen. I think the fact that it was live and not canned made a big difference. I certainly appreciated it more.

Me: “You appreciated it more?”

C: “Yeah, I was humming the tune afterwards. I don’t know, just something about it really made me pay attention.”

A: “After reading the comments, the presence of the choir really seemed to change peoples’ engagement with each performance. I mean it was hard not to, but a lot of people definitely commented on that.”

D: “True. I’m glad you said something here about the lack of technology. It definitely made a big difference.”

Me: “Was there anything else that you noticed in the transcripts, codes, or themes?”

D: “I noticed again that there were a lot of different reactions to different things that affected our engagement.”
B: “Yeah, I noticed for me that if I didn’t like the performance, I really didn’t feel like I wanted to listen, but when I thought it was performed better, I felt more engaged.”

E: “There is so much here to consider, but from what I can see I think you captured it all.”

As the conversation continued, there was nothing new that was added to the codes or themes. After we went through our conversation, I asked the members if there was anything that they felt that they wanted to add that I didn’t have on the code list or any of the themes that appeared. None of the members had anything to add to the lists. Member E stated that, “this was really interesting to see how many different ways we all responded to the songs. This was such a simple thing to do, but who knew listening was so complex. This was fun.” Member D then added, “yes, thank you for letting us be a part of this.” At the end of the session, I thanked the members for their participation in the member check process.

Based on members’ responses during the member check meeting, the member check participants corroborated the codes and themes identified based on my analysis of the qualitative data.
CHAPTER 6
Discussion, Convergence of Methods, and Conclusions

The purpose of this study was to examine the effect of presentation mode on community college students’ ratings of a choral performance and self-perceived level of engagement with the music controlling for age, gender, and previous musical training. The following research questions were addressed:

1. What effect, if any, does presentation mode have on participants’ ratings of the quality of a choral performance?
2. What effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of the quality of a choral performance?
3. What effect, if any, does presentation mode have on participants’ ratings of their engagement with the music during a choral performance?
4. What effect, if any, does participants’ age, gender, or previous musical training have on participants’ ratings of their engagement with the music during a choral performance?
5. Why do participants rate the quality of a choral performance of one presentation mode higher than others, if at all?
6. Why do different presentation modes make participants feel more or less engaged with the music, if at all?

Quantitative measures were the primary data source analyzed to understand the effect of presentation mode on participants’ ratings of quality (Research Question 1), the effect of presentation mode on participants’ ratings of their engagement with the music
(Research Question 2), the effect of participants, age, gender, or previous musical training on the ratings of quality (Research Question 3), and participants’ ratings of their engagement with the music (Research Question 4). Qualitative data were collected and analyzed to understand why participants rated the quality of a performance in one presentation mode higher than another (Research Question 5) and why different presentation modes may make participants feel more or less engaged with the music (Research Question 6). Summaries of findings related to each research question are presented in this chapter in the following order:

1. Summary of findings relative to research questions 1 and 2 (based on quantitative data analysis)

2. Summary of findings relative to research questions 3 and 4 (based on quantitative data analysis)

3. Summary of findings relative to research question 5 (based on qualitative data analysis)

4. Summary of findings relative to research question 6 (based on qualitative data analysis)

Although the design of the study aligned quantitative and qualitative measures with particular research questions, findings based on my analysis of the data converged informing conclusions for each research question.

Discussion of Quantitative Results

Quantitative measures were used to address research questions one through four. Below, I have summarized the results for each research question. Because research
questions 1 and 2, and 3 and 4 are related to each other, I have summarized the data for each pair of research questions together.

**Research Questions 1 and 2.** To answer research question 1, I needed to understand what effect presentation mode may have on participants’ ratings of the quality of a choral performance. Participants listened to three *a cappella* choral performances in three presentation modes: audio-only recorded, audio-visual recorded, and live performance. Descriptive statistics were calculated for each presentation mode and the ratings were analyzed. Multivariate analysis was conducted to understand how the means of ratings for each performance changed for each presentation mode.

After completing multivariate analysis comparing the means of the quality ratings for the performance in each presentation mode, it was revealed that presentation mode had a significant main effect on participants’ overall ratings of the quality of the performance ($F[2, 56] = 23.947, p < .001, \eta_p^2 = .461$). A pairwise comparison of the means of the ratings of quality for the different presentation modes revealed that there was a significant difference between the ratings of quality of the audio-only and audio-visual presentations ($p < .001$), audio-only and live performance ($p < .001$), and the audio-visual and live performance ($p < .001$). There was a significant within-subjects effect for quality between the different presentation modes ($F[2, 114] = 27.416, p < .001, \eta_p^2 = .325$) meaning that the presentation mode was a significant predictor of individual participants’ ratings of the quality of each performance. Additionally, there was a significant between-subjects effect ($F[1, 57] = 1548.160, p < .001, \eta_p^2 = .964$) meaning that presentation mode was a significant predictor when comparing participants’ ratings
of quality. Based on these results, presentation mode had a significant effect on
participants' ratings of the quality of each a cappella choral performance.

To answer research question 2, I needed to understand what effect participants’
age, gender, and previous musical training may have had on their ratings of the quality of
a choral performance in each presentation mode. Descriptive statistics were computed
and analyzed to understand the ratings of quality for each presentation mode when
controlling for participant age, gender, and previous musical training. There appeared to
be differences between the participants’ ratings based on age, gender, and previous
musical training, though the differences between means were small.

A three-way repeated measures MANCOVA was conducted to understand not
only the main effect of each independent variable, but to also examine their interaction
with the dependent variable (ratings of quality). Participant age, gender, and previous
musical training did not have any significant effect on participants’ ratings of the quality
of any performance in any of the presentation modes. Additionally, tests of within-
subjects and between-subjects effects were completed to examine what effect the
independent variables of age, gender, or previous musical training may have had on
differences between individual participants’ ratings of quality and between different
participants’ ratings of quality. Although there were not any significant effects between
subjects, age did have a significant within-subjects interaction with participants’ ratings
of the quality of each performance when presentation mode was changed \(F[4, 114] = 2.928, p < .05, \eta_p^2 = .093\). A pairwise comparison was completed to further understand
how age interacted with participants’ ratings of quality. Based on the pairwise
comparison, I found that the significant interactions of age and quality ratings were evident only for the audio-only recording. There was a significant difference ($p < .01$) between the estimated marginal means of the quality ratings of the audio-only recorded presentation for the 18-24 year old age group when compared to the 25-44 year old age group. No other significant differences were evident. Based on the pairwise comparison and probability level of within-subjects effects resulting from the three-way repeated measures MANCOVA, the results of the within-subjects effect of age appears inconclusive and tentative at best.

The results of the analysis of the quantitative data for research questions 1 and 2 support some of the findings evidenced in previous research and contradict the findings of other studies. For example, participants rate performances in certain presentation modes more favorably (Howard, 2012). In the current study, participants rated the live performance more favorably than the audio-only and audio-visual presentation. Participants also had different perceptions of what they are presented in different presentation modes (Geringer et al., 1997; Lychner, 2008). Considering Geringer et al.'s (1997) findings, the participants in the present study had a stronger response to the live presentation, not the audio-visual presentation. Similar to Woody's (2004) study, presentation mode can affect perception. Additionally, participants are able to discriminate between good and bad quality based on what they hear (Madsen & Geringer, 1999; Madsen et al., 1993). In the present study, participants did have different perceptions of the quality of what they were presented, though the differences could not be accounted for based on individual differences in age, gender, or previous musical
training. It is important to note that a large number of participants in the present study were late adolescents. Although the question of preference was not asked, the participants did rate the quality of live presentation higher than others.

Overall, based on my analysis of the data, presentation mode had a significant effect on community college students' ratings and perceptions of quality of an a cappella choral performance. Specific independent control variables of gender and previous musical training did not have any significant effect on the students' ratings of the quality of each performance. Although there was a significant within-subjects interaction of age, more data is needed to really understand if age truly has a significant effect on students' ratings of the quality of a performance for each presentation mode. Based on the results of the quantitative analysis, additional questions remain unanswered regarding why the quality of one presentation may have been viewed more favorably than another (Research Question 5).

**Research Questions 3 and 4.** To answer research question 3, I needed to understand what effect presentation mode may have on participants' self-perceived level of engagement with the music during each performance. Participants listened to three a cappella choral performances in three presentation modes: audio-only recorded, audio-visual recorded, and live performance. Descriptive statistics were calculated for each presentation mode and the engagement ratings were analyzed. Multivariate analysis was conducted to understand how the means of engagement ratings for each performance changed for each presentation mode.

To obtain valid F-ratios in the multivariate analysis, I applied the Greenhouse-
Geisser correction statistic because of significant results of Mauchly’s test of sphericity. A significant result of Mauchly’s test of sphericity meant that the assumption that the variance of the difference between each pair of repeated measures was equal had been violated. The correction was applied to the degrees of freedom in the statistical analysis to correct for the sphericity. After completing multivariate analysis comparing the means of the ratings of perceived level of engagement with the music for the performance in each presentation mode, presentation mode had a significant main effect on participants’ perceived level of engagement with the music \( (F[2, 56] = 49.235, p < .001, \eta_p^2 = .637). \) A pairwise comparison of the means of the ratings of quality for the different presentation modes revealed that there was a significant difference between participants’ level of engagement for the audio-only and live performance \( (p < .001), \) and the audio-visual and live performance \( (p < .001). \) There was not a significant difference \( (p > .05) \) between the engagement levels of the audio-only and audio-visual presentation modes. There was a significant within-subjects effect for participants’ level of engagement between the different presentation modes \( (F[1.717, 97.881] = 30.626, p < .001, \eta_p^2 = .350) \) meaning that the presentation mode was a significant predictor of individual participants’ perceived level of engagement during each performance. Additionally, there was a significant between-subjects effect \( (F[1, 57] = 844.924, p < .001, \eta_p^2 = .937) \) meaning that presentation mode was a significant predictor when comparing participants’ ratings of engagement level. Based on these results, presentation mode had a significant effect on participants’ perceived level of engagement with the music for each \textit{a cappella} choral performance.
To answer research question 4, I needed to understand what effect participants' age, gender, and previous musical training may have had on their ratings of their level of engagement with a choral performance in each presentation mode. Descriptive statistics were computed and analyzed to understand the ratings of engagement for each presentation mode when controlling for participant age, gender, and previous musical training. There appeared to be differences between the participants' ratings of engagement level based on age, gender, and previous musical training, though the differences between means were small.

A three-way repeated measures MANCOVA was conducted to understand not only the main effect of each independent variable, but to also examine their interaction with the dependent variable (ratings of perceived level of engagement). Participant age, gender, and previous musical training did not have any significant main effects or within-subjects effects on participants' ratings of their perceived level of engagement with the music for any performance in any of the presentation modes. Additionally, tests of between-subjects effects were completed to examine what effect the independent variables of age, gender, or previous musical training may have had on differences between different participants' ratings of their level of engagement. Although there were not any significant effects within subjects, years of previous musical training did have a significant between-subjects interaction with participants' perceived level of engagement with the music of each performance when presentation mode was changed ($F[2, 57] = 3.476, p < .05, \eta^2 = .109$). A pairwise comparison was completed to further understand how years of previous musical training interacted with participants' ratings of quality.
Based on the pairwise comparison, I did not find any significant differences between the estimated marginal means of years of previous musical training for any of the presentation modes. Although years of previous musical training was a significant predictor of between-subjects differences in engagement level, more data may be needed to truly understand the interaction of years of musical training and participants’ level of engagement with the music.

The results of the analysis of the quantitative data for research questions 3 and 4 support some of the findings evidenced in previous research. Participants felt more engaged with music presented in one presentation mode more than in another showing that presentation mode can affect perception not only of quality, but of individual levels of engagement when listening to music (Woody, 2004). Moreover, presentation mode did have a significant effect on how participants perceived the performance either more or less favorably (Howard, 2012) and based on what they heard (Geringer et al., 1997; Lychner, 2008). Based on the results of the quantitative data analysis, there are some clear differences between the results and the results of previous research related to engagement. Although researchers have identified that younger students’ responses to music varies by age (Kerchner, 2000; Killian, 2001), there was no significant interaction of age with adult students’ ratings of engagement level in the present study. Although the participants could all be classified as undergraduate students, based on the within- and between-subjects comparisons of participants’ engagement levels, no significant results were evident in the present study. Some researchers have posited that gender may have an effect on what students’ perceive when they listen to music based on historical and
philosophical arguments. Similar to previous research completed by Dunn (2008), the results of the present study do not support a finding that gender differences existed in participants’ perceptions of quality or engagement. In fact, gender had the lowest level of interaction and significance of any of the control variables. Though gender did not have any significance in this study, the effect of a students’ gender on their listening experience is still not completely clear or understood if one exists at all. Additionally, years of previous musical training may have some effect on participants’ perceived level of engagement; however, the results of the present study are inconclusive and continued scholarly investigation is needed to really understand the effect of previous musical training on students’ level of engagement during listening experiences.

Overall, based on my analysis of the data, presentation mode had a significant effect on community college students’ perceived level of engagement with the music of an *a cappella* choral performance. Specific independent control variables of age and gender did not have any significant effect on the students’ ratings of their level of engagement. Although there was a significant between-subjects interaction of participants’ years of previous musical training, more data is needed to really understand if previous training truly has a significant effect on students’ perceived level of engagement with the music for each presentation mode. Qualitative results (Research Question 6) will be discussed in the next section of this chapter to address why different presentation modes make participants feel more or less engaged with the music.

**Discussion of Qualitative Findings**

Qualitative measures were used to address research questions 5 and 6. Below, I
have summarized the results for each research question based on my reflections on the analysis of the data previously discussed in Chapter 5.

**Research Question 5.** In research question 5, I wanted to understand why participants rated the quality of a performance in one presentation mode higher than another. To understand this phenomenon, I collected written statements from the participants explaining why they rated the quality of the presentation mode the way that they did in their own words. The data were coded and five major themes were identified.

The first theme was participants’ focus of attention appeared to change with presentation mode. In the audio-only presentation, participants commented that they did not know where to look, what to focus on, or had to force themselves to concentrate. This supports Dunn’s (2008) findings that subjects had to force themselves to concentrate during the audio-only presentation while appearing more focused during audio-visual listening activities (p. 70). Focus was difficult for some participants during the audio-only presentation and what participants focused on during each presentation mode was not always musical. This was most evident with the combination of both the auditory and visual components in the audio-visual and live presentations. The addition of a visual component to the choral performance seemed to affect participants’ focus of attention on different factors related to the listening experience. Additionally, there appeared to be a cross-modal interaction between the visual and auditory stimuli affecting participants’ perceptions of the quality of each *a cappella* choral performance. The identification of a cross-modal interaction in the current study is supported by previous research results by Cross (2003), Levitin and Menon (2005), and Gonzalo and Büchel (2003). Based on
participants' comments, the visual stimulus did appear to have an effect on what participants heard or expected to hear affecting their overall perception of quality of what they heard.

The second major theme was that environmental factors influenced participants' perception of quality. This theme is directly related to the theoretical framework on which this study was based. During the study, the music listening experience was imposed (Clarke, 2005) on students using different presentation modes. In Clarke's (2005) ecological theory of music listening and Deutsch's (1999) discussion of music perception, the "information processing approach" (Deutsch, 1999, p. 11) appears to be the way that many participants' perceived the quality of the performance. For example, rather than addressing only the physical environment in terms of acoustics—which would be typical of a bottom-up approach or hierarchical understanding of music listening—many participants' comments were related to the disciplines of psychoacoustics (attributes of sound), cognition (form, tonality, and texture), or aesthetic value (see Chapter 1, Figure 1, p. 28). Participants commented on the music itself, factors affecting their perception of the listening experience, aesthetic value, and meaning related to their environment. Participants' comments related to environmental factors (what they saw, heard, and experienced) and perception of quality of a performance support Clarke's (2005) ecological theory of perception as a multi-directional process rather than what music educators may view as a hierarchical way of understanding music listening.

The third major theme was that technology affected participants' perceptions of quality. Again, participants gave both cognitive and affective responses based on what
they heard. For both the audio-only and audio-visual performances, the use of technology for recording and playback of the performances affected their perception of quality. Because the quality of the visual stimulus was particularly viewed as poor by many participants, they perceived the quality of the performance as being lower. For the audio-only presentation, some participants felt that the quality of the performance was very good and that the recording was relatively clear. Other participants felt that the quality of the audio-only recording negatively affected their perception of quality, particularly when related to diction, range, and blend. The technology used for playback of the audio-only recording was viewed by some participants as not being able to handle the higher notes performed by the sopranos. Others felt that they may not have understood the words as clearly because of the technology both in the audio-only and audio-visual presentation modes. Although the technology seemed to negatively influence participants’ ratings of quality, the lack of technology had a very positive effect on participants’ perception of the quality of performance. Many participants’ stated that they perceived the quality of the performance as being the best in the live performance often noting the lack of technology. Therefore, the use of technology when presenting listening experiences to students in a music appreciation class may have an effect on the perception of the quality of what they have heard.

The fourth theme I identified was that participants’ preference for a presentation mode affected their perception of the quality. Several participants stated that they didn’t perceive the quality of a performance as being very high or low because it was not presented in a preferred presentation mode. Many participants stated that they preferred
the live presentation mode more than the audio-only and audio-visual presentation modes. It is possible that participants’ predisposition to prefer one presentation mode more than another prior to the study affected their perception of the quality of each choral performance.

The final theme I identified was that perceptions of performance quality are unique to the individual. Although there were three presentation modes used, participants reacted to the quality of the performance in very different ways. There were multiple influences that affected participants’ written responses about the perception of quality for each presentation mode. Major themes were definitely identifiable on a macrolevel of analysis, but there were even more themes that could be explored at a microlevel of analysis. Different factors, be they the music itself, or other factors including environmental, technological, or anything in between, affected participants differently which they articulated in their written responses. Therefore, regardless of presentation mode, the listening experience is unique to the individual and clearly not a “one-size-fits-all” experience.

Overall, I concluded that different presentation modes affected participants’ ratings of quality in a variety of different ways. My conclusion also supports Dunn’s (2008) finding that “presentation mode appeared to qualitatively change the music listening experience” for students. Different presentation modes have their advantages and disadvantages that are different for each individual participant. The audio-only presentation mode tended to influence participants’ perceptions of quality by focusing their attention on the auditory stimulus; however, without a visual stimulus many
participants felt that other environmental factors may have distracted them. The additional of a visual stimulus did have an effect on what participants experienced in terms of their perceptions of the quality of the performance supporting previous research findings previously discussed. In the audio-visual presentation, the visual stimulus was perceived to have a negative influence whereas in the live presentation it had a positive influence. Environmental factors including sound quality, classroom, the presence of live singers, aesthetic value, and musical factors were different for each presentation mode. The presence of the live singers and their proximity to the participants was considered to have a positive effect on the quality of the performance by many participants. At times, the classroom and aesthetic value perceived by the participants based on their perceptions of the quality of the performance had both positive and negative impacts on their perception of the overall quality of each performance. Most importantly, although each presentation mode affected participants’ reactions to the music in terms of the perceived quality of the performance in both positive and negative ways, participants’ reactions were unique to themselves as individuals. This observation also supports the conclusion that the act of music listening is a subjective human experience.

In addition to the themes identified and my conclusions, it is also clear from participants’ responses that there some limitations of the study that were exposed through data collection. Although I attempted to control for different effects that can result from repeated measures such as not using the same piece of music for each experience, there were some effects of the repeated measures design that affected results. For example, because the participants heard the same choir perform all three pieces, each piece was
different but heard one after the other, and participants were aware that they were participating in this study, there was a modified Hawthorne effect (Gall et al., 2007, p. 390). The fact that participants were aware of what was being studied and that the same choir was used for each listening experience, it is possible that participants may have felt the quality of the live performance with the live choir would have or should have the highest quality. Therefore, it is important to consider the issue of the Hawthorne effect in both quantitative and qualitative results.

**Research Question 6.** In research question 6, I wanted to understand why different presentation modes may make participants feel more or less engaged with the music. To understand this phenomenon, I collected written statements from the participants explaining why they rated the quality of the presentation mode the way that they did in their own words. The data were coded and four major themes were identified.

The first theme I identified was that specific musical factors influence engagement level. In the audio-only recorded presentation, participants commented on a number of attributes related to the music itself. In contrast to their comments about the audio-only presentation, participants’ focus of attention was on other factors related to the audio-visual presentation. The number of participants’ comments increased for the live presentation. After examining participants’ comments, I noticed that the more comments about music itself that participants made, the more engaged they seemed to feel with the music. Participants did state clearly that they felt more engaged with one presentation mode more than another regardless of what they perceived musically. The musical information participants were able to perceive and the perceived quality level of
what they heard affected participant’s level of engagement. For example, participants commented about the music in relationship to performance quality frequently during the audio-only presentation, but did not perceive the quality of what they heard as being overly good or bad causing many to not feel engaged. For the audio-visual presentation mode, there were far fewer comments about the music specifically and the quality of what participants did say that they heard was perceived as lower and was the reason provided by many participants regarding the lower level of engagement with the music. During the live presentation, the number of comments about the quality of the performance increased as did the perceived level of quality of what participants heard. Participants’ perceptions of their level of engagement level increased significantly for the live presentation mode. Based on these observations, it appears that not only do participants focus their attention and perceive different types of information about an *a cappella* choral performance, but their perception of the quality of the performance can affect their level of engagement. In the present study, participants’ level of engagement increased for the live presentation mode because, based on participants’ written statements, the music itself and other factors of the performance were perceived as more positive compared to other presentation modes.

The second theme that I identified was that other factors influence engagement level. Some factors appeared to be more important and influential for the audio-visual and live presentation modes. For example, the visual stimulus was a factor that negatively influenced many participants’ level of engagement during the audio-visual presentation mode. If the camera work would have been more varied and interesting, and perceived as
being of better quality, perhaps participants would have felt more engaged with the music. For example, in music videos and movies, the camera is not stationary like it was in the present study. The camera often moves around providing the listener/watcher with the ability to view the action taking place from a variety of different angles. Because the camera did not move in the present study, the audio-visual recorded stimulus was not typical of other audio-visual music listening experiences. This may have affected the participants’ perceptions of the experience. Based on participants’ comments, the lack of camera movement impeded their focus of attention and it is not clear exactly what they may have been evaluating at all times during the audio-visual listening experience. Additional factors, including the perceived skill level of the performers, dress, facial expression, and performers’ engagement with each other during each performance were also influential.

During the live presentation, participants responded that they felt more engaged because the performers were (a) engaged, (b) present in the room in close proximity to the participants, (c) perceived to have a high quality skill level, (d) professional, and (e) fun to look at. Moreover, the factors that the participants commented on led many participants to say that they felt more connected with the performers; therefore, the performance seemed to have more meaning for the participants increasing their perceived level of engagement. For the audio-visual presentation mode, many participants commented that they felt that the same factors were substandard making them feel disconnected and less engaged.

A variety of different factors appeared to be influential when a visual stimulus is
present in the performance. Perhaps because the performers were in such close proximity to the participants for the live presentation, the participants felt more engaged or were forced to feel engaged. If so, then participants did not perceive this the same way that they stated they felt forced to engage with the music during the audio-only recorded presentation because there were not any other stimuli present.

The third theme I identified was that the presence or absence of technology influences engagement level. The audio-only and audio-visual presentation modes both used technology both for the recording of the a cappella choral performances and the playback of the performances to participants. Participants stated that they felt disconnected and less engaged during the performances that required the use of technology. In the audio-only presentation, participants stated that felt disconnected because of a lack of a visual stimulus. In the audio-visual presentation, participants commented that because they perceived the quality of the recording and of the visual stimulus as being substandard that they felt less engaged and again disconnected from the performance. The specific technology used in this study may have made the choral performances seem autonomous to participants. The audio-only and audio-visual performances were performances that had already taken place and could stand alone. There was nothing unique to them and therefore it appeared that participants had a harder time attributing any meaning to the performances because they did not feel like they were part of the performance.

The listener-performer connection was not evident in participants’ comments. In fact, many of them noted that the disconnection caused them to feel less engaged and less
appreciative of the audio-only and audio-visual performances. Whereas the listener-performer connection was not evident in the audio-only and audio-visual performances, the connection was clearly made with a majority of participants for live performance. Participants noted that they felt more connected, as if they were a part of the performance, thus feeling more engaged with the music and more appreciative of the performance, even applauding at the conclusion of the performance. I concluded that because the use of technology for two of the presentation modes caused many participants to feel disconnected with the music, that the use of technology in the audio-only and audio-visual presentations negatively influenced participants’ ability to engage with the music. The lack of technology in the live presentation was viewed as beneficial to many participants because many of the participants were able to attribute some type of meaning or level of appreciation positively to the live presentation.

The final theme that I identified was that participants’ perceived quality of performance influenced their perceived level of engagement. The quality of the audio-visual presentation was perceived as being the lowest as documented by participants’ comments and ratings. Because the quality of the audio-visual performance was perceived as lower, participants did not feel as engaged with the music. The quality of the audio-only presentation was perceived as being higher than the audio-visual, but several participants commented that their engagement felt forced because of the lack of a visual stimulus. The presence or lack of a visual stimulus seemed to be a very important factor to many participants throughout the study. Although there was not a visual stimulus, the quality of the audio-only presentation was higher and participants’ perceived level of
engagement was also higher. Additionally, even though the level of engagement was higher, the use of only an auditory stimulus may have forced participants to feel more engaged because they had no other choice. During the live presentation, participants perceived the quality of the performance as being very high documented both in their written responses and their ratings. Because the quality was perceived as being better, the participants also stated that they felt more engaged. Participants commented on what they could hear, were more detailed in their responses, and many stated that they felt like they wanted to listen or to hear more.

Overall, there were many different reasons participants felt more or less engaged with performances in the three different presentation modes. Although participants may have had preferences for different presentation modes, the perceived quality of the performance itself and the technology were all important influences on participants’ feeling of engagement with the music. The presentation mode appeared to be an intervening mechanism that affected participants’ responses (Sloboda & Juslin, 2010). I have concluded that, in the present study, multiple influences did affect participants’ level of engagement with each performance and that these influences were unique to the individual participant based on their perceptions of the listening experience.

Convergence of Methods

Based on the designs discussed of mixed-methods research discussed by Creswell and Plano Clark (2011) in Designing and Conducting Mixed Methods Research, the converging of the quantitative and qualitative data is important, especially in a concurrent procedures mixed-methods study. The intention the mixing of the data was to allow
convergence and corroboration of the findings, but also to provide a better understanding of the phenomenon of how presentation mode effects community college students’ perceptions of the quality of and engagement with the music during an *a cappella* choral performance. This also serves to triangulate the data for purposes of validity (Creswell & Plano Clark, 2011, p. 133) and to examine the complementarity of the findings to increase my understanding of the phenomenon being studied (Creswell & Plano Clark, 2011, p. 136).

**Triangulation of Findings**

The purpose of triangulating the findings is to provide validity to the data and conclusions and to counteract any of my own biases were previously stated (Creswell & Plano Clark, 2011, p. 133; see Chapter 5, p. 154).

**The effects of presentation mode on participants’ ratings and perceptions of quality.** Through quantitative data collection and analysis, I concluded that presentation mode did have a significant effect on participants’ ratings of the quality of an *a cappella* choral performance. Participants’ ratings were significantly different (*p* < .001) for the different presentation modes. I also found that gender and years of previous musical training did not have any significant effect on participants’ ratings of quality of each choral performance. Age did have a significant (*p* < .05) within-subjects effect on participants’ ratings of the quality of the performance.

The finding that presentation mode did have significant effect on participants’ ratings of the quality each performance was corroborated by the qualitative data collection and analysis. Based on the themes identified as a result of analysis and coding
of the data that were corroborated in a member checking process, the qualitative data support the quantitative findings. Participants commented that many different factors that were perceived as important and influential in each individual performance affected their perception of the quality of the performance. One of the most important factors was the presence or lack of a visual component and cross-modal interaction of the auditory and visual experiences. Moreover, the quality of the performance was based on many different factors by participants contradicting some of my own biases previously identified in Chapter 5. Additionally, there were no significant reactions of gender and previous musical training also contradicting some of my own biases reported earlier.

**The effects of presentation mode on participants’ perceived level of engagement.** Through quantitative data collection and analysis, I concluded that presentation mode had a significant effect on participants’ perceived level of engagement with the music \( p < .001 \). I also concluded that age and gender did not have any significant effect on participants’ perceived level of engagement. I did conclude the years of previous musical training did have a significant interaction with participants’ engagement level between subjects. A pairwise comparison did not yield any significant differences; therefore, I cannot conclude that years of previous musical training had any real effect on participants’ level of engagement.

The finding the presentation mode did have a significant effect on participants’ perceived level of engagement with the music was corroborated by the qualitative data collection and analysis. Based on the themes identified as a result of analysis and coding of the data that were corroborated in a member checking process, the qualitative data do
not fully support the quantitative findings. Participants did not attribute their level of engagement to only the presentation mode. A number of factors specifically related to each performance appeared to have some influence on participants' level of engagement with the music. Reasons for participants' level of engagement were extremely varied. Although many participants did attribute some of their perception of their individual level of engagement with the music to the presentation mode, many attributed their level of engagement to other factors that were not specific to presentation mode. This contradicted some of my own biases stated earlier in Chapter 5. Participants’ statements also corroborated my stated bias that presentation mode would have some type of effect on participants’ perceived level of engagement to some degree. Additionally, there were no significant reactions of age and gender also contradicting some of my own biases reported earlier.

**Complementarity of the Findings**

Part of my intention for conducting a mixed methods study was to have a deeper understanding of the phenomenon being studied. To do this, it was necessary to elaborate and clarify the findings of one method with the findings of another (Creswell & Plano Clark, 2011, p. 136-137).

**Presentation mode and quality.** The qualitative data definitely complemented the quantitative findings regarding the effects of presentation mode on participants’ ratings of quality. From a strictly quantitative perspective the results of my quantitative analysis demonstrated that presentation mode appeared to have a significant effect on participants’ ratings of quality; however, there was no information regarding why there
was a significant effect. Based on the qualitative analysis, it was clear that, although presentation mode had a significant effect, there were multiple influences that contributed to the effect on presentation mode on participants' perceptions of quality. By examining the phenomenon of the effects of presentation mode on participants' perceptions of quality qualitatively, I was able to understand that the idea of "presentation mode" appeared to encompass much more than how a performance was presented to students. For instance, when examining the effects of presentation mode on ratings of the quality of the audio-visual and live performances, there were significant differences in the participants' ratings. By exploring the effects of presentation mode qualitatively I discovered that presentation mode not only included how the performance was presented to students, but that there were multiple layers to each presentation mode that affected participants' perception of quality. If I had not explored the question qualitatively, then attributing significance to only the presentation mode in the context of how music is presented to students in a listening experience might have been made. Consequently, it is clear that different factors related to the performance, the music itself, and other factors including the environment and technology all had some influence on participants' perceptions of the quality of each performance. Therefore, I have concluded that my own definition of presentation mode may need to be re-examined because how students perceive a performance and perceive a presentation mode itself may be defined more broadly and with more complexity than originally imagined.

**Presentation mode and engagement.** The qualitative data also complemented the quantitative findings regarding the effects of presentation mode on participants'
ratings of their perceived level of engagement with the music. After completing quantitative analysis, I found that presentation mode did have a significant effect on participants' perceived level of engagement. The results of my qualitative analysis supported the quantitative results. Again, based on qualitative data analysis, multiple influences and interpretations as to why presentation mode had a significant effect on participants' level of engagement exist. By examining the phenomenon of the effects of presentation mode on participants' perceived level of engagement qualitatively, I was able to understand that the idea of "presentation mode" again may encompass much more than how a performance was presented to students. For example, when examining the effects of presentation on participants' level of engagement qualitatively, I found that how music was presented to participants (presentation mode) was not the only variable that affected the participants' level of engagement. Although participants did state preferences for a presentation mode, many commented on how some presentation modes forced them to feel engaged when others made them want to be engaged with the music. If I had not explored the question qualitatively, then attributing significance to only the presentation mode in the context of how music is presented to students in a listening experience might have been made. Moreover, it is important to note that what draws a participant into the performance and makes them want to listen to the music, and what they focus their attention on when listening also may affect their level of engagement. Because of this, I feel that I have a better understanding of the phenomenon of listening, at least within the context of the present study, and that presentation mode is a much broader concept than originally defined. Therefore, I have again concluded that my own
definition of presentation mode should be re-examined because how students engage with music during an *a cappella* choral performance and perceive a presentation mode is much more complex and requires continued inquiry for better understanding.

**Re-examining Presentation Mode**

When considering the definition of presentation mode, I first defined it as the method used to present material to others. In the context of this study, presentation mode was further defined as a method to present *a cappella* choral performances to students in a music appreciation class. Although a presentation mode is how a person might present material to others, in the music listening context the presentation mode is influenced by many different factors. Environmental factors including location and technology (quality of the technology, presence or absence in presentation) are just two of many of the factors that can influence participants’ perceptions about what they hear in relation to presentation mode. Therefore, it is important to consider that the environment in which the material is presented to others is actually a part of the presentation mode. The presence of different factors other than the music itself appeared to be an important consideration for the participants in this study, especially related to quality and engagement. For example, the use of a stationary camera for the audio-visual presentation mode brought about a focus of attention on the technology and camera angle used rather than on the music itself. Additionally, the presence of the live choir in the room with the participants during all of the presentations could have been influential to participants’ perceptions and therefore the choir may have been an influential part of each presentation mode. The acoustics at each data collection site were slightly different. The participants’
perceptions of the listening experience related to acoustics were influenced by the environment where the listening experience took place. Based on the evidence, it is clear that environmental factors influenced participants’ perceptions of the quality and perceived level of engagement with each listening experience.

Conclusions

After re-examination of how presentation mode is defined based on analysis of the results and subsequent discussion, there is evidence from this study that presentation mode has an effect on community college students’ perceptions of the quality of and engagement with an *a cappella* choral performance. The findings do not support many aspects of Clarke’s (2005) ecological theory of perception of musical meaning or Hargreaves et al.’s (2012) reciprocal feedback model. Clarke (2005) stated that the ecological approach to music listening emphasizes the “importance of information as information for something (objects and events),” explaining that:

> It is the objects and events that are specified in perception that are important [and] when perception proceeds in an unproblematic way, we are usually unaware of the sensory aspect of the stimulus information, and we are only attuned to the events that are specified by the stimulus structure (i.e. the music and the sounds themselves) (p. 32).

Perception did not proceed in an unproblematic way in the present study. Contrarily, perception was influenced by many facets of the sensory aspect of the stimuli including the technology used for playback, acoustics, the singers, and other extraneous influences. Participants were aware of more than the objects and events “specified in the stimulus structure” (Clarke, 2005, p. 32). Participants were often more aware of many different influences other than the “music or sounds themselves” (Clarke, 2005, p. 32).
Additionally, Clarke (2005) noted that one of the premises of his theory was that perception and meaning are closely related because when a person perceives what happens around them, he/she tries to understand and adapt to his/her environment. In this study, participants perceived what was happening around them, but did not always adapt to the environment. Contrarily, the environment affected participants’ perceptions of the quality of what they heard and their engagement with the music either positively or negatively.

Results based on quantitative analysis of the data support the conclusion that presentation mode has a significant effect on students’ perceptions of quality and engagement. Results of qualitative data collection and analysis helped me to better understand and explain how presentation mode affects students’ perceptions of quality and engagement. Additionally, findings based on qualitative inquiry confirm the individual nature of the listening experience and that individual students will have their own unique reactions to music based on what they have heard and their perceptions of the listening experience.

**Recommendations for Future Research**

More research is necessary for music educators to understand the phenomenon of music listening to be able to both understand the phenomenon and to enhance the listening experiences of students in community college music appreciation classrooms. If this study were to be replicated, I would recommend collecting data more than once at each data collection site over a longer period of time. I would also recommend having a choir from a school other than the data collection prepare the audio-only, audio-visual,
and present the live choral performance. The results may be different if a choir that is unknown to participants is used as the performing ensemble for data collection purposes.

As part of any future research, it will be important for researchers to consider the terminology used as part of the study. For example, in this study I used the term quality assuming that the participants would have a basis for understanding differences between higher or lower quality performances. Based on the findings of qualitative analysis in the current study it is clear that, faced with this decision, participants had to delve into their previous experiences and used context based criteria for assessing quality. This was not quite what I had hoped that they would do. For future research, I would reconsider the use of the term quality and define quality more concretely for participants prior to data collection.

One of the limitations of the present study was the repertoire and design and may need some reconsideration in future research. Though I attempted to control for any effects of repertoire on the results but limiting the type of repertoire and ensemble, the fact that only one type of repertoire and performance ensemble were used in the present study limits the generalizability of the results. In future research, researchers may consider using different types of repertoire and compare if students’ perceptions of performance quality and focus of attention change. Moreover, additional research is necessary to understand if there is any correlation between participants’ perceptions of quality and engagement when different types of repertoire or performance ensembles are used. For example, it is unknown if similar results would be found if only instrumental music was used rather than choral music especially considering the number of participant
comments about lyrics, words, and diction in the present study. Moreover, the ensemble size may have also had an effect on the results and should be considered in future research. If a large concert choir or concert band were used, and compared with performances of a barbershop or string quartet, it is possible that the results would be different. It will be important for ensemble size and repertoire to be considered in the design of future research.

In future research, the use of an experimental design may be advisable to understand how presentation mode affects students' development of listening skills. This may include the use of a control group that only listens to music presented in audio-only formats while experimental groups use audio-visual and live performances to help students acquire both analytical and critical listening skills.

Additional scholarly inquiry is also needed to understand how age, gender, and previous musical training affect students' perceptions of the quality of a performance and their ability to engage with the music. Although the current study attempted to control for these factors, it is clear that more research is needed. It may be advisable to attempt the same study with students at different educational levels (grades K-5, 6-8, 9-12, college undergraduate, and college graduate student) to understand how age, gender, and previous musical training may have different effects based on a more defined definition of the musical training participants have received and their specific age. In addition, some in-depth studies comparing how presentation modes might affect participants' perceptions of quality of and engagement with a music performance similarly or differently in and outside of the regular music appreciation classroom would be
beneficial.

I also recommend that researchers investigate presentation mode order as part of the research design. Based on the present study, it is unknown whether participants’ ratings and written responses may have been influenced by the order that the presentation modes were used. The present study could be repeated using a quasi-experimental design. A control group would follow the same procedures used in the present study. Two experimental groups would receive the same treatments in a different order to see if participants’ ratings and written responses were affected by presentational order.

Another topic that requires further scholarly inquiry is the issue of students’ preferences for different presentation modes. Although a specific question was not asked regarding participants’ preference for a performance or a presentation mode, participants did provide comments with regard to preference. Moreover, it would be important to investigate whether the order of the presentation modes affect a participants preference for a particular performance. Additional mixed-methods research would also be helpful because the issue of preference is often unique to the individual and may be better understood through analysis of both quantitative and qualitative data.

Finally, listening and cross-modal interaction between visual and auditory stimuli has been an important topic of inquiry in marketing and consumer research. For music educators, additional scholarly inquiry is needed to understand how marketing and consumer research may be used in the classroom regarding cross-modal interactions of stimuli and students’ appreciation of music. Not only are music educators teaching
students analytical and critical listening skills, but we are training current and future consumers of music. The investigation of the uses of principles of cross-modal interaction in marketing and consumer research in the music classroom may be beneficial to music educators and influence some of our teaching practices.

**Implications for Music Educators**

The results of this study have implications for the practice of collegiate music educators teaching listening skills in the music appreciation classroom. The data related to the effects of presentation mode on the students perceived level of engagement with the music during an *a cappella* choral performance may provide collegiate music educators, specifically those teaching students music appreciation, with additional information about how the way music is presented can affect students' perceptions of the performance. For example, what an instructor may perceive as a high quality performance may not be perceived the same by students affecting their overall appreciation for the music that they have heard.

Using multiple presentation modes to present the same concepts to students may be preferred within the context of teaching listening skills. Each student perceived something different both about the quality and their ability to be engaged with the music during each listening experience. Presenting music in a variety of different ways may help students to perceive different parts of a musical performance differently enhancing the overall experience and future development of analytical and critical listening skills. Moreover, presenting music using different presentation modes removes the idea that there is only one way to teach listening skills and that “one-size-fits-all.” Listening to
music is clearly a subjective, individual experience and music educators should attempt to make music listening as meaningful as possible if students are to continue to appreciate and be active music consumers in the future.

It is also important to note that presence of a live choral ensemble was perceived as more engaging by the students in this study. It may be important for collegiate music educators to not only require students attend live musical performances as part of developing appreciation for music and listening skills, but to also bring live performers into the classroom to perform works for students. The presence of the live performers appears to make the listening experience more meaningful. In the present study, the students who participated demonstrated that when listening to a live performance they were able to recognize a variety of different factors that affected their perception of the quality of and engagement with the music during the performance.

It will also be important for music educators to recognize that presentation mode may encompass more than just how music is presented, but the variety of factors that students perceive as a result of using a presentation mode for a listening experience in the music classroom. Music educators should take into account the different factors that can affect students' perceptions of a musical performance when using different presentation modes. By doing this, music educators may enhance the listening experience for their students affecting their appreciation and consumption of music in the future.

The results of this study also have implications for pre-service music educators. The teaching and acquisition of analytical and critical listening skills is not confined to the collegiate music appreciation classroom. Pre-service music educators should practice
using a variety of different ways of listening to and experiencing music in the classroom. They should learn how students listen to music, how students make meaning based on what they have perceived in a musical performance, and how to use different presentation modes to teach students how to be active analytical and critical listeners. The development of listening skills will benefit not only the student in the music classroom, but in other educational and nonacademic arenas as well.

Finally, as music educators we must make the music listening experience meaningful if students are to develop their listening skills within the context of the music classroom. To do this, we must remember that not all students will be music performers, but many may likely be future music consumers and audience members. To develop appreciation for music, the music listening experience must not only be educational in terms of developing analytical and critical listening skills, but it must have individual meaning for the student. Students make meaning of the music listening experience differently from each other and the way music is presented in and outside of the music classroom may affect the meaning students make when listening to music. Therefore, it is important to remember as music educators—regardless of the educational level that we are currently teaching—that all students are participants in music but some will participate in music differently. The music listener is just as important as the performer, if not more so as consumers of music and future audience members.

I hope that my colleagues who teach music appreciation and listening skills will find this study helpful and as interesting as I have. It would be gratifying if the results of the study are able to inform the development of future research and understanding within
the growing body of research about music listening and students’ perceptions of what they hear. It is my hope that this study will lead current and future music educators to explore the phenomenon of listening and music appreciation with students of all ages and that this area of inquiry may have important implications on the future development of the practice of music education.
APPENDIX A

Data Collection Forms

Purpose of the study: The purpose of this study is to examine the effects of presentation mode on community college students’ ratings of a choral performance and self-perceived level of engagement with the music controlling for age, gender, and previous musical training.

Directions for completing this form: Please answer each of the questions. The information that you provide will be kept completely confidential. Please DO NOT put your name or the name of your school on this form to maintain anonymity.

DEMOGRAPHIC DATA

Please answer each question below.

1) What best describes your age? (Please check one)
   ____ 18-24    ____ 25-44    ____ 45-64    ____ 65+

2) What is your gender? (Please circle one)
   Male          Female

3) How many years have you received a music education? (Please check one. Include all years you have received music instruction.)
   ____ Low (0-4 years)    ____ Middle (5-10 years)    ____ High (10+ years)

Once you have completed this side of the form, please stop and wait for instructions.
ENSEMBLE PERFORMANCE #1

AUDIO-ONLY RECORDING

You will hear an audio-recording of an *a cappella* choral work. The recording has not been edited or mastered in any way.

Using the four point scale below, please rate the overall quality of the performance. Use 1 to indicate poor performance quality and 4 to indicate excellent performance quality.

The performance of the *a cappella* choral work was: (Circle one)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td></td>
<td></td>
<td>Excellent</td>
</tr>
</tbody>
</table>

Why did you select the rating above? ____________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

Using the four point scale below, please rate your perceived engagement with the music during the performance. Use 1 to indicate little engagement and 4 to indicate very engaged.

How engaged did you feel with the music while listening to the audio-only recording of the choral work? (Circle one)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Little</td>
<td></td>
<td></td>
<td>Very</td>
</tr>
</tbody>
</table>

Why did you select the engagement level above? ____________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________
ENSEMBLE PERFORMANCE #2

You will experience a performance of an *a cappella* choral work presented using a different presentation mode. The presentation mode will be either live or audio-visual recording.

Using the four point scale below, please rate the overall quality of the performance. Use 1 to indicate poor performance quality and 4 to indicate excellent performance quality.

The performance of the *a cappella* choral work was: (Circle one)

1 2 3 4

Poor Excellent

Why did you select the rating above? __________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Using the four point scale below, please rate your perceived engagement with the music during the performance. Use 1 to indicate little engagement and 4 to indicate very engaged.

How engaged did you feel with the music while listening to the audio-visual recording of the choral work?

1 2 3 4

Little Very

Why did you select the engagement level above? ________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

ENSEMBLE PERFORMANCE #3

You will experience a performance of an *a cappella* choral work presented using a different presentation mode. The presentation mode will be either live or audio-visual recording.

Using the four point scale below, please rate the overall quality of the performance. Use 1 to indicate poor performance quality and 4 to indicate excellent performance quality.

The performance of the *a cappella* choral work was: (Circle one)

1. Poor
2.
3.
4. Excellent

Why did you select the rating above? __________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

Using the four point scale below, please rate your perceived engagement with the music during the performance. Use 1 to indicate little engagement and 4 to indicate very engaged.

How engaged did you feel with the music while listening to the live choral performance of the choral work? (Circle one)

1. Little
2.
3.
4. Very

Why did you select the engagement level above? __________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY!

Please enjoy the cookies and juice!
APPENDIX B

Codebook—Quality

A. General, non specific comments
   a. Positive
   b. Negative

B. Musical Attributes
   a. Melody
   b. Rhythm
   c. Harmony
   d. Range
   e. Tone Quality
   f. Dynamics
   g. Intonation
   h. Balance/Blend
   i. Repertoire Selection/Difficulty
   j. Texture
   k. Entrances/cutoffs
   l. Togetherness
   m. Difficulty level
   n. Undefined/Unidentified Mistakes

C. Diction
   a. Positive
   b. Negative

D. Quality of Voices/Singing (Skill Level)
   a. Professionalism/Rehearsed/Prior Effort Leading to Performance
   b. Undefined/Unidentified Mistakes

E. Association with prior event/memory

F. Quality of the Stimulus
   a. Audio-Only Recording Quality
   b. Audio-Visual Recording Quality
      1. Audio
      2. Visual
   c. Live Performance Quality
   d. Preference for a particular presentation/comparison with other presentations in the study
   e. Preference for a presentation mode

G. Technology Affects Quality
   a. Positive
   b. Negative
c. Lack of Technology

H. Effect of Physical Environment
   a. Proximity of Singers and Participant
   b. Physical Room
   c. Acoustics
   d. Conductor

I. Performers
   a. Look
   b. Facial Expression
   c. Interaction
   d. Connected

J. Emotion/Expressiveness
   a. Performers
   b. Repertoire

K. Other
   a. Familiarity with music
   b. Engagement level affected perception of quality
APPENDIX C

Codebook—Engagement

A. General, non-specific comments
   a. Positive
   b. Negative

B. Connectivity
   a. Felt Connected
   b. Felt Disconnected

C. Stimuli Affects Focus of Attention
   a. Audio Only
   b. Audio & Visual Recording
   c. Live Choral Performance
   d. Perceived clarity of the stimuli

D. Musical Attributes
   a. Dynamics
   b. Blend
   c. Tone
   d. Form/Repetition
   e. Texture
   f. Style of Music
   g. Lyrics
   h. Emotional Feeling/Mood

E. Diction
   a. Audio-only
   b. Audio-visual
   c. Live

F. Personal Reaction/Feeling
   a. Tired
   b. Bored
   c. Pleasure
   d. Physical Reaction
   e. Personal/Realness
   f. Personal preference for PM
   g. Personal reaction may or may not affect performance
   h. Association with non-active listening experience
      1. Positive
      2. Negative
G. Physical Environment
   a. Classroom
   b. Technology
   c. Proximity

H. Singers
   a. Proximity to Participants
   b. Facial Expression
   c. Interaction/Feeling of Personal Interaction
   d. Perceived level of engagement while performing

I. Perceived Quality of the Performance
   a. Positive influence on engagement
   b. Negative influence on engagement

J. Other Nonmusical Attributes
APPENDIX D

Recruitment Script

RECRUITMENT SCRIPT

Hello and Good (Morning/Afternoon),

My name is James Reddan, a Doctoral student in Music Education in the College of Fine Arts at Boston University. I would like to invite you to participate in my research study to examine the effect of presentation mode on community college students’ ratings of a choral performance, and self-perceived level of engagement with the music controlling for age, gender, and previous musical training.

You may participate in this study if you are age 18 or older and currently enrolled in this community college’s Music Appreciation course.

As a participant, you will be asked to listen to an audio recording of a choral performance, listen and watch an audio-visual recording of a choral performance and listen to and watch a live choral performance. After each listening activity, you will be asked to rate the overall quality of the performance you experienced and rate how engaged you felt with the music during each experience. After you have completed the two ratings, you will be asked to briefly explain why you assigned your ratings. The time commitment for this part of the study will be no longer than your regular class meeting time.

After completion of this portion of the study, I will be handing out cards for anyone that would like to participate in a member checking process to review the research findings and provide feedback about my interpretation of the data. This is completely voluntary and will be completed at one of three times listed on the information card. If you are interested in participating in the member checking process, please return the completed card before you leave. The information requested will be your first name only, an email address, and phone number. The information will be kept separately from the other parts of this study and only available to me. Your names and information will be kept completely confidential and will never be used in any part of the study. All of the information cards will be destroyed at the completion of this study.

There is minimal risk involved when participating in this study. The only risks are possibly feeling tired or being unfamiliar with some of the music. Your privacy is of utmost importance and all of your responses are completely anonymous. No identifying information will be used for this study and all study materials will be kept safe on only available to me. At the end of the data collection process I will provide cookies and juice. There are no other benefits or risks by participating in this study. You may choose to not
participate or withdraw from participation in this study at any time without penalty. Participation or non-participation will not affect your grade or academic standing in this course or at your school in any way.

If you would like to participate in this research study, please stay. If you do not want to participate you are free to leave at this time.

Do you have any questions now? If you have questions later, please contact me at reddan6041@comcast.net or you may contact my advisor, Dr. Peter Webster, at pwebster@northwestern.edu.
APPENDIX E

Boston University IRB Authorization

Notification of IRB Review: Exemption Request

October 23, 2013

James Reddan
College of Fine Arts
Music Education
Boston, MA 02215

Protocol Title: Effects of Presentation Mode on Community College Students’ Perception of Performance Quality and Musical Engagement
Protocol #: 3332X
Funding Agency: Unfunded
IRB Review Type: Exempt 2

Dear Mr. Reddan:

On October 23, 2013, the IRB determined that the above-referenced protocol meets the criteria for exemption in accordance with CFR 46.101(b)(2). Per the protocol, you will examine the effect of presentation mode on community college students’ ratings of a choral performance, and self-perceived level of engagement with the music controlling for age, gender, and previous music training. The exempt determination includes the use of: recruitment script, consent language, member check volunteer card, and data collection forms.

Additional review of this study is not needed unless changes are made to the current version of the study. Any changes to the current protocol must be reported and reviewed by the IRB. If you have any changes, please submit the Clarification Form located at http://www.bu.edu/irb/. No changes can be implemented until they have been reviewed by the IRB.

In approximately six months, you will receive an inquiry from the IRB to ascertain whether your study still meets the requirements for exempt review.

If you have any questions, please contact me at 617-358-6115.

Sincerely,

Mary McCabe
IRB Analyst
Charles River Campus IRB
REFERENCES


CURRICULUM VITAE

James Michael Reddan
3016 Geary Street SE, Albany, OR 97322
jdr71980@aol.com

Year of Birth: 1978

Education

2014
Doctor of Musical Arts in Music Education
Boston University, College of Fine Arts (Massachusetts)
Dissertation: Effects of Presentation Mode on Community College Students' Perception of Performance Quality and Self-Reported Level of Musical Engagement

2004
Master of Music in Music Education
University of Oregon, School of Music (Eugene)
Project: The Use of the International Phonetic Alphabet to Correct Diction Problems in the Junior High School Choral Classroom: A Longitudinal Study

2001
Master of Music in Choral Conducting
University of Oregon, School of Music (Eugene)

1999
Bachelor of Arts (Cum Laude) in Music Education
McDaniel College, Westminster, Maryland
Major: Music Education with Departmental Honors

1996
Diploma and Certificate of Merit
Thomas Stone High School, Waldorf, Maryland

Additional Preparation

2000, 2001
Oregon Bach Festival
University of Oregon School of Music. Studied choral and orchestral conducting with Helmuth Rilling and Thomas Sommerville.

1997
Study Abroad Participant
Griffith University--Queensland Conservatorium of Music, Brisbane, Australia.
Six month overseas study course.
Emphasis: Music Education and Choral Conducting

Professional Licenses

2002–Present
License for Educational Personnel: State of Nevada
Teaching license endorsements in Vocal/Choral Music 7-12 and Music K-12.
Teaching Experience

2008–Present  
*Faculty of Music & Director of Choral Activities*  
*Performing Arts Department Co-Chair*  
Linn-Benton Community College, Albany, Oregon.

2005–2008  
*Choral Music Educator & Performing Arts Department Chair*  
Arbor View High School, Clark County School District, Las Vegas, Nevada.

2002–2005  
*Choral Music Educator*  
Helen C. Cannon Junior High School, Clark County School District, Las Vegas, Nevada.

Other Conducting Experience

2001–2002  
*Artistic Director/Conductor*  
The Eugene Gleemen, Eugene, Oregon, 97401.

2000–2002  
*Choral Director*  
St. Thomas Episcopal Church, Eugene, Oregon, 97401.

Additional Employment History

2004–2007  
*Course Instructor*  
Curriculum & Professional Development, Clark County School District and Sierra Nevada College, Incline Village, Nevada.

1999–2001  
*Choral Librarian*  
University of Oregon School of Music, Eugene, Oregon.

1996–1999  
*Choral Librarian, Teachers Assistant, Vocal Coach*  
McDaniel College Department of Music, Westminster, MD.

1998  
*National Symphony Orchestra Library Intern*  
Washington, DC.

Discography

2012  
*Ear Candy* featuring the Linn-Benton Community College Choirs

2010  
*Music is My Refuge* featuring the Linn-Benton Community College Choirs
Publications and Presentations

2014  “Music Education: Shaping Our Future Leaders.”
      Presentation for Leadership Corvallis, February 2014.

2014  “Practice What You Preach: An Investigation of the Practice and
      Memorization Strategies of Students in a Collegiate Concert
      Choir.” Presented at the Oregon Music Educators Association
      Conference, January 2014.

2012  “A Life of Music & Singing.” Presented for the Academy of
      Lifelong Learning, Oregon State University, February 2012.

2004  “The Use of the International Phonetic Alphabet to Correct Diction
      Problems in the Junior High School Choral Classroom: A
      Longitudinal Study.” Presented at the Nevada Music Educators

2002  “Overview of Diction Methods for Choral Conductors.” Presented
      at the Oregon Music Educators Association Conference in Eugene,

      the Texts and What’s Really Out There!” in the ACDA Choral

Honors and Awards

2010  Winners Within Us Magazine: Winning Teacher (November)

2010  American Prize in Choral Conducting—Special Citation:
      Excellence in Music Education

2009  Princeton Premiere Educator Award

2007  Walmart Teacher of the Year—Nevada Southern Region

2007  Finalist for Kiwanis and CCSD Educator of the Year

2007  CCSD Northwest Region “Educator of the Year”

2007  Choral Director Magazine “Choral Director of Note”

2006  Who’s Who Amongst America’s High School Teachers
2005  Who’s Who in America

2004  Distinguished Educator Award, Southeast Region, Clark County School District

2003  Nominee--New Teacher of the Year, Clark County School District

2003  Finalist--New Music Educator of the Year, Nevada Music Educators Association

1999  McDaniel College Class of 1938 Award for Excellence in Music

1999  Who’s Who Amongst Students in American Universities and Colleges

1998  McDaniel College Student Research and Creativity Grant Recipient

1998, 1999  McDaniel College Griswold Zepp Award/Grant in Volunteerism

1996  Felix Woodbridge Morely Award, McDaniel College

**Professional Memberships**

2012–Present  Society for Music Teacher Education (SMTE)

2011–Present  International Federation of Choral Music (IFCM)

2011–Present  College Music Society (CMS)

2011–Present  International Society for Music Education (ISME)

2008–Present  Oregon Music Educators Association (OMEA)

2008–Present  Oregon Chapter American Choral Director’s Association

1997–Present  Kappa Delta Pi--National Educator’s Honor Society

1996–Present  National Association for Music Education (NAfME)

1995–Present  American Choral Director’s Association (ACDA)