

EFFECT OF ORFF-BASED MUSIC INTERVENTIONS ON STATE ANXIETY
OF MUSIC THERAPY STUDENTS

By

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B.M.E., Illinois State University, 2010

Submitted to the graduate degree program in Music Education and Music Therapy and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Music Education (Music Therapy).

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Date Approved: December 18, 2014

Abstract

The purpose of this study was to evaluate the effectiveness of Orff-based music therapy as a potential music intervention used to decrease state anxiety of music therapy students. For these students, high levels of state anxiety can be detrimental to the quality of clinical treatment, and ultimately their career goals. Thirty-two music therapy college students volunteered for the study and were randomly assigned to one of two experimental conditions. Participants individually took part in either a three-minute breathing intervention or improvisation music intervention and completed the state portion of the State Trait Anxiety Inventory (STAI) as a pretest and posttest measure. One-way repeated measures analysis of variance was conducted to compare groups and potential differences from pretest to posttest. Results of the ANOVA revealed a statistically significant decrease in anxiety for both conditions with neither emerging as more effective than the other. Implications for professional fields and recommendations for future study are discussed.

Acknowledgements

Firstly, I thank Dr. Cynthia Colwell for your unending support and brilliance. You have been an excellent mentor, instructor, and supervisor since our very early conversations prior to my admission to KU. I cannot begin to express in this short paragraph how much I appreciate your confidence in me, which has been so empowering along the way, as well as the educational opportunities and challenges you have provided me. Your attention to detail, extensive knowledge of the Orff Schulwerk approach, and your clinical and research wisdom has and will continue to be an asset to my development as a student, clinician, and researcher.

To Dr. Deanna Hanson-Abromeit and Dr. Abbey Dvorak for sharing your time and expertise while serving on my thesis committee. Your support, guidance, and suggestions were invaluable.

To Dr. Dena Register for your astounding influence on me as a person, student, and practitioner. You have been instrumental in broadening my perspective on this field as well as how the puzzle pieces of life can come together. I thank you for our many coffee conversations and your unending positive encouragement to reach for the moon.

To Jennifer Fiore for sharing your clinical wisdom and always providing detailed feedback as my practicum supervisor. Our weekly car talks were quite fruitful for my development.

To Dr. Vicki Peyton for your statistical consultations and your willingness to always take the extra step as a professor, even after I was no longer enrolled in your classes.

To Scott, Mary, and Annie for cheering me on during this challenging, yet exciting, journey. Your loyalty, support, and positive energy bring me great strength, and your encouragement and honesty have been critical in keeping me balanced.

To my extremely bright classmates and colleagues, particularly Megan Joseph, Amanda Helms, and Aaron Quisenberry, who have played an integral role in my education and growth as an individual. You have each provided me with a great deal of inspiration and your thoughtful feedback is immeasurable.

And finally, I thank my family for your endless love and support. You have each taught me some of the most important lessons about life, which have been my core as I have traveled near and far to pursue my goals. Thank you for always believing in me and allowing and encouraging me to take risks, even when they sent me states and continents away.

Table of Contents

ABSTRACT.....	iii
ACKNOWLEDGEMENTS.....	iv
TABLE OF CONTENTS.....	vi
CHAPTER 1 Introduction.....	1
CHAPTER 2 Review of Literature.....	6
State Anxiety.....	6
Performance anxiety.....	7
Music therapy student performance anxiety.....	8
Relationship Between Anxiety and Respiration.....	12
Treatment and Coping Strategies for Performance Anxiety.....	14
Effect of Music on Psychological and Physiological Systems.....	16
Music Stimuli Used to Reduce State Anxiety.....	19
Therapeutic function of music for anxiety reduction.....	20
Music Therapy Interventions to Address State Anxiety.....	22
Active music engagement.....	24
Breathing training.....	26
Orff Schulwerk.....	27
Orff approach in music therapy.....	27
Purpose of Study.....	30
CHAPTER 3 Method.....	32
Participants, Recruitment, and Informed Consent.....	32
Setting.....	33
Materials.....	33
Measurements.....	34
Design and Data Analysis.....	34
Procedure.....	34
Group 1 (cued breathing).....	35
Group 2 (improvisation).....	35
CHAPTER 4 Results.....	38
CHAPTER 5 Discussion.....	40
Limitations.....	41
Suggestions for Future Research.....	42
REFERENCES.....	46

Chapter 1

Introduction

Anxiety and fear are familiar emotional states experienced by a variety of people on a day-to-day basis. There are many commonalities between these two concepts, particularly their psychological and physiological manifestations within the body. Given regulation of the amygdala via the prefrontal cortex, low levels of anxiety and fear can play a positive role in contributing to attention, awareness of surroundings, safety, and even productivity (Öhman, 2005; Rosen & Schulkin, 1998; Studer, Gomez, Hildebrandt, Arial, & Danuser, 2011). While the emotional states of anxiety and fear can be consciously regulated, they are a result of automatic brain mechanisms (Rosen & Schulkin, 1998). Nevertheless, it is important to distinguish between anxiety and fear.

Fear is believed to be an evolutionary trait in both humans and animals, preparing them to appropriately react to danger or aversive situations (Spielberger, 1985). This includes somatic and autonomic activation as well as cognitive or perceptual processing, which enables physical action to decrease the negative affective experience (Rosen & Schulkin, 1998). In this heightened alert state the body acts in characteristic ways, preparing to either flee or defend itself. Darwin (1872/1965) add original date described the manifestations of fear as rapid heart palpitations, pupil dilation, increased perspiration, dry mouth, erection of hair, and changes in vocal quality and facial expression. Walter Cannon (1914) later coined this phenomena the *fight-or-flight* response. Within this response, fear and rage are accompanied by physiological changes, enabling the body to face a threat.

While fear is considered to be a necessary autonomic response for protection, anxiety is often differentiated as a subjective, human-specific, non-functional emotional state (Spielberger,

1985). Freud (1924) considered anxiety to be an unpleasant emotional state consisting of affective, behavioral, and physiological components, aroused from anticipation of harm or danger. In addition, Freud (1936) described anxiety as being either objective, an appropriate and functional response to negative stimuli in the external environment (i.e., fear); or subjective, a response to internal thoughts or feelings (i.e., neurotic anxiety). Similarly, Öhman (2008) distinguishes fear from anxiety by accounting for the presence of an identifiable external stimulus. Thus, fear occurs *post*-stimulus (i.e., elicited by a defined fear stimulus), while anxiety occurs *pre*-stimulus (i.e., anticipatory to a perceived threatening stimuli) (Öhman, 2008).

For the purpose of this paper, the focus will be on this subjective, anticipatory, and pre-stimulus emotion, hereinafter referred to as *anxiety*. Spielberger (1985) discusses two types of anxiety, trait and state, and has established the importance of distinguishing between them. Trait anxiety is viewed as relatively stable periods of anxiety, thus defining a personality trait (Spielberger, 1985). Spielberger defines state anxiety as a transitory emotional state that “consists of subjective, consciously perceived, feelings of tension, apprehension, nervousness, and worry, accompanied by or associated with activation and arousal of the autonomic nervous system” (p. 176). Individuals with high trait anxiety habitually experience high levels of state anxiety, and have a tendency to view the world as dangerous and threatening (Spielberger, 1985). State anxiety—the dependent variable for this study—differs from trait anxiety in that the episodes are less frequent and shorter in duration.

Since the present study was conducted to pilot two music therapy protocols to reduce state anxiety of music therapy students, state anxiety will primarily be discussed in the context of performance anxiety. Performance anxiety consists of an out of proportion fear to a performance situation involving feelings of humiliation and possible scrutiny by others (American

Psychological Association, 2013a, 2013b). Performance anxiety can affect those involved in music, dance, or theatre performance; public speaking; athletic competition; and academic testing. Performance anxiety is also seen in music therapy students, particularly when required to *perform* in an exam-like environment to demonstrate proficiency in various musical and clinical skills during their college education. Symptoms of performance anxiety are similar to those of fear as described earlier by Darwin (1872/1965) and including increased heart rate, panic attacks and increased *fear* of panic attacks, increased perspiration, dry mouth, trembling, cold hands, and abnormal breathing patterns (Bögels et al., 2010; Studer, Danuser, Hildebrandt, Arial, & Gomez, 2011; Studer et al., 2012). Cognitive and cognitive-behavioral therapies are widely considered to be the treatment of choice for performance anxiety (Bögels et al., 2010; Kenny, 2010), but pharmacological treatments, primarily beta-blockers, are also commonly used and shown to be effective (Bögels et al., 2010). Other treatments include meditation, yoga, biofeedback, breathing training, and relaxation (Kenny, 2005).

Another treatment option used to reduce state anxiety is music therapy. Music therapy is a clinical and evidence-based field, which uses music to address functional goals. Music therapy interventions to decrease state anxiety are diverse including music assisted progressive muscle relaxation, instrument play, music listening, music-based imagery, autogenic training with music, and mindfulness-based breathing and music. Music therapy literature supports the use of music to decrease state anxiety by significantly affecting psychological and physiological changes (Davis & Thaut, 1989; Ferrer, 2007; Gadberry, 2011; Robb, 2000; Robb, Nichols, Rutan, Bishop, & Parker, 1995; Walworth, Rumana, Nguyen, & Jarred, 2008).

Key characteristics necessary for effective music intervention include offering client control, the foundation of a strong therapeutic relationship, and client engagement. A standard of

care in music therapy is client-centered treatment. A client-centered approach contributes to the development of the therapeutic alliance and offers opportunities for client control, which helps reduce feelings of anxiety but also promotes engagement in interventions. By engaging and participating in the creative process, clients may feel a sense of empowerment and safety; which promotes emotional expression, positive changes in affect, and increased coping skills, ultimately reducing feelings of anxiety.

An additional intervention possibility in music therapy is Orff-based music therapy—the independent variable for the present study—which is adapted from the music education technique developed by Carl Orff and Gunild Keetman (Colwell, 2005, 2009; Colwell, Achey Pehotsky, Grillmeister, & Woolrich, 2008). With its highly engaging and participatory approach, Orff-based music therapy can address many of the same goals as traditional music therapy including reducing anxiety, increasing emotional expression, elevating mood, and improving coping skills (Colwell, 2009). In a therapeutic setting, the Orff Schulwerk approach provides natural opportunities for autonomy, client-control, and involvement in the therapeutic process (Colwell, 2009). Additionally, the Orff Schulwerk process focuses on using structured musical experiences to improvise and create (Colwell et al., 2008). The exploration of worries, fears, and anxiety in this creative yet structured musical environment provides a medium for emotional processing, a key component in anxiety reduction (Foa & Kozak, 1986).

In consideration of the previously discussed psychological mechanisms involved in state anxiety including attention, emotion, and thought, there is an emerging body of evidence promoting the use of Orff-based music therapy to address psychological, behavioral, and emotional needs (Colwell, Edwards, Hernandez, & Brees, 2013; Hilliard, 2007; Register & Hilliard, 2008). However, there is yet to be an Orff-based music therapy study addressing state

anxiety. Orff-based music therapy interventions are hypothesized to be effective for reducing state anxiety due to their provision of implicit opportunities for emotional expression, active engagement in the treatment process, and the development of coping skills—three areas associated with positive effects on anxiety.

Music therapy college students seem to experience high levels of state anxiety during important clinical musicianship examinations and must develop positive coping strategies, such as the use of Orff-based music interventions, to effectively manage their anxiety in order to succeed academically and professionally. Thus, the purpose of this study was to evaluate the effectiveness of Orff-based music therapy as a potential music intervention used to decrease state anxiety of music therapy students.

Chapter 2

Review of Literature

This chapter provides an overview of the research literature relating to the effects of using Orff-based music therapy interventions to reduce state anxiety. Areas examined in this chapter include (a) state anxiety, specifically in the context of performance anxiety; (b) the relationship between anxiety and respiration; (c) treatment and coping strategies for performance anxiety; (d) the effect of music on psychological and physiological systems; (e) the function of music stimuli in reducing state anxiety; (f) music therapy interventions to address state anxiety including active music engagement and breathing training; and (g) Orff Schulwerk and its approach in music therapy. Finally, this chapter will conclude with the purpose of this study and the research questions being addressed.

State Anxiety

State anxiety is a transitory emotional state that “consists of subjective, consciously perceived, feelings of tension, apprehension, nervousness, and worry, accompanied by or associated with activation and arousal of the autonomic nervous system” and is experienced by a variety of people on a day-to-day basis (Spielberger, 1985, p. 176). The intensity of state anxiety varies greatly among persons and across situations for every individual. There are a number of factors that may contribute to a person’s level of state anxiety including fear, environmental elements, and outside stressors (Robb et al., 1995). Fear is an autonomic and adaptive response to dangerous or threatening situations such as car accidents, severe weather conditions, or physical fights (Rosen & Schulkin, 1998). Environmental elements may elevate levels of state anxiety. Examples of these environmental elements include unfamiliar sounds or places, a large

room of strangers, or a timed exam. Lastly, outside stressors can also elicit state anxiety and include the following: issues at school, familial stress, plans for the future, or health conditions.

According to Kieffer and Reese (2009), anxiety is a problem that affects a significant proportion of college students. Anxiety can limit students' academic success and, subsequently, their career and professional opportunities, but it can also perpetuate severe health consequences like hypertension and lowered immune defenses (Kieffer & Reese, 2009). Since the present study was conducted to pilot two music therapy protocols to reduce state anxiety of music therapy students, state anxiety will be discussed in the context of performance anxiety.

Performance anxiety. Performance anxiety, also referred to as stage fright (Kenny, 2010; Studer, Gomez, et al., 2011) is not recognized as a specific diagnosis by the American Psychological Association; however, it is mentioned as a non-generalized anxiety subset under social anxiety disorders (American Psychological Association, 2013a). While the American Psychological Association's description of social anxiety disorder is better categorized as trait anxiety due to the criterion of typically lasting six months or more, its first criterion consists of an out of proportion fear to a performance situation involving possible scrutiny by others and potential feelings of humiliation or embarrassment (American Psychological Association, 2013a, 2013b).

Common situations that induce performance anxiety include music, dance, or theatre performance; public speaking; athletic competition; and academic testing. Instrumentalists seem to be most affected by performance anxiety among performing artists, followed by singers, dancers, and actors (Marchant-Haycox & Wilson, 1992). Symptoms of performance anxiety include increased heart rate, panic attacks and increased *fear* of panic attacks, increased

perspiration, dry mouth, trembling, cold hands, and abnormal breathing patterns (Bögels et al., 2010; Studer, Danuser, et al., 2011; Studer et al., 2012).

Kenny (2010) specifically addressed performance anxiety in musicians and sought to provide a clear definition of music performance anxiety, distinguishing it from performance anxiety in general as well as from other anxiety disorders—specifically social anxiety disorder:

Music performance anxiety is the experience of marked and persistent anxious apprehension related to musical performance that has arisen through specific anxiety-conditioning experiences. It is manifested through combinations of affective, cognitive, somatic and behavioural symptoms and may occur in a range of performance settings, but is usually more severe in settings involving high ego investment and evaluative threat. . . . It affects musicians across the lifespan and is at least partially dependent on years of training, practice, and level of musical accomplishment (Kenny, 2010, p. 433).

Performance anxiety in musicians can negatively impact their well being and health, impact the quality of their performance, lead to avoidance or interruption of the performance, and even limit the possibility of a future performing career (Studer, Gomez, et al., 2011).

Music therapy student performance anxiety. For the purpose of this paper, it is important to explore music performance anxiety specifically in music therapy students. Music *performance* by music therapists in a clinical setting is not necessarily viewed as the same as traditional music performance; however, this does not mean they do not experience performance anxiety. Music therapists are required to be proficient on a variety of instruments and across many genres, largely differing from music *performers* who often have a primary instrument and focus on a narrower repertoire. In addition to the range of music foundations, music therapists are also required to demonstrate skills and understanding in two main competencies: 1) clinical

foundations, such as therapeutic applications and the therapeutic relationship, and 2) music therapy, such as client assessment, therapy implementation, and research methods (American Music Therapy Association, 2014a). Given the responsibility of implementing proficiency across musical genres on several instruments with the combination of focusing on clinical goals and the musical product, music therapists are susceptible to anxiety beyond what is accounted for in our understanding of music performance anxiety.

Music therapy students are required to *perform* for faculty, instructors, and/or supervisors several times throughout their college education, demonstrating a wide range of musical skills in singing, piano, guitar, and leading a group. For many students, voice, piano, or guitar is not their primary instrument; however, functional skills on these instruments are still required per the American Music Therapy Association's Professional Competencies (2014a). In a study of 292 new music therapy college students, Clark and Kranz (1996) found 44% of students had 3+ years of experience on piano, 41% had 3+ years of experience in voice, and only 23% had a background in guitar. While development of these skills is a primary focus in music therapy training programs, performing on one of these potentially unfamiliar instruments early in a music therapy student's career may elicit a high level of state anxiety (Wheeler, 2002).

In addition to proficiency in musical instruments, music therapy students are also expected to sing and play in a variety of musical genres, and to use improvisation, in preparation for working with a diverse clientele. Representing many decades, these genres include traditional, folk, and popular music (American Music Therapy Association, 2014a). Performing in a genre that isn't preferred or comfortable for the music therapist may also elicit state anxiety (Pitts & Cevasco, 2013). Kim (2011) points out that performing music appropriate for the United States population can be very demanding for international music therapy students, thus anxiety

provoking on these students. Interestingly, Clark and Kranz (1996) found that classical music was most preferred among 292 new music therapy students, followed by rock, then popular music. This certainly is not surprising as preference for classical music may be a byproduct of years of classical training, which many music therapy students have. However, it may be concerning as popular music is frequently used and preferred by clients receiving music therapy (Davis & Thaut, 1989; Pitts & Cevasco, 2013).

A few researchers have found musical preparedness to be a key concern for music therapy students (Madsen & Kaiser, 1999; Pitts & Cevasco, 2013; Wheeler, 2002). Madsen and Kaiser (1999) conducted a study with 61 music therapy students during their senior year, asking them to list their three greatest fears concerning their internship. It is important to note that Madsen and Kaiser's definition of fear more closely aligns with this study's operational definition of anxiety. They found that fear of not being prepared was the highest for the music therapy students, but fear of failure also ranked very high. This seems reasonable, as the internship is the place where students must demonstrate previous learning in a practical manner (Madsen & Kaiser, 1999). These feelings of anxiety may be similar to those associated with music therapy students' clinical musicianship assessments prior to internship, where students must also demonstrate music skills for faculty and supervisors.

A later study conducted by Wheeler (2002), also assessed concerns of music therapy students. Wheeler examined eight music therapy students' experience over a one-year period, specifically related to their music therapy practica. Two of the areas that emerged from the open-ended interviews were musical skills and musical progress. Two students, both vocal majors, felt the need for better music skills. One student mentioned that she felt like she did not have the musical background other students had, and she could not get the music to sound the way she

wanted. Four students, who were also vocal majors, had never played guitar or piano prior to their music therapy training. They mentioned that their musical skills improved during the progression of their practica, and they felt more confident, comfortable, and prepared by the end (Wheeler, 2002). This study may provide insight into the potentially higher levels of music performance anxiety experienced by beginning level practicum students, as they have less experience utilizing clinical musicianship skills. The one student's concerns about her musical product sounding inauthentic (Wheeler, 2002) may not only cause anxiety in performance, but could also potentially inhibit therapeutic outcomes for her clients. Nolan (2005) discusses the importance of the musical product in eliciting emotional expression, noting that the aesthetic experience of the music is important in providing opportunities for prompting by the therapist and structure within verbal processing.

Most recently, a study by Pitts and Cevasco (2013) investigated music therapy students' experiences in hospice and palliative care. From 55 responses regarding information they wish they had known before beginning their work in hospice and palliative care, 20% wished they knew more music and interventions, while 9% wished they had better guitar skills. One student advised "practice until you can fingerpick hymns in your sleep" (Pitts & Cevasco, 2013, p. 149), while another student feared his lack of guitar skills would kill a patient. Alternatively, students mentioned that developing guitar skills and a wide range of repertoire were the only two proficiencies that prepared them most for working with this population (Pitts & Cevasco, 2013). In addition to the previous two studies, these results provide a clear basis that music therapy students are concerned about their musical preparedness and performance in the clinical setting. In many of these cases, these concerns were manifested in stress, discomfort, and self-consciousness—key characteristics associated with music performance anxiety (Kenny, 2010).

Clinical musicianship assessments during music therapy training prove to be anxiety provoking for many students. In these assessments, music therapy students are evaluated by faculty and supervisors on a wide range of music skills in areas they may not be comfortable or prepared in, but they must also incorporate clinical and therapeutic skills in their “performance”, potentially exacerbating existing levels of music performance anxiety. High anxiety during these assessments may prevent music therapy students from performing at their best level due to the previously discussed negative psychological and physiological effects associated with anxiety, potentially preventing them from continuing on in their degree program.

Relationship Between Anxiety and Respiration

As discussed earlier, state anxiety can have adverse effects on psychological and physiological systems, including respiration. Not only can poor respiratory function further induce anxiety, but it can contribute to other health related issues. Specifically, anxiety’s effects on respiration can include hyperventilation. Hyperventilation is defined as breathing in excess of metabolic requirements. Over-breathing leads to a drop in the partial pressure of arterial CO₂ and a rise in the blood pH level, which can ultimately cause a deficiency in oxygen supply (Studer, Danuser, et al., 2011), thus exacerbating levels of anxiety (Diest et al., 2001; Gomez, Stahel, & Danuser, 2004). The metabolic changes induced by hyperventilation may explain other psychological and physiological symptoms (i.e., shortness of breath, cold hands, confusion) that are present with anxiety (Studer, Danuser, et al., 2011).

Suess, Alexander, Smith, Sweeney, and Marion (1980) conducted a landmark study with 29 college students who were placed in a psychologically stressful situation. The researchers revealed significant increases in state anxiety and respiration rate and significant decreases in end-tidal CO₂ (i.e., hyperventilation) (Suess et al., 1980). Similarly, Gomez et al. (2004)

confirmed that negative or unpleasant psychological stimuli elicit a respiratory response, specifically noting decreased inspiratory and total breath duration and increased thoracic (i.e., chest or shallow) breathing. These breathing changes can induce hyperventilation, which often inflates anxiety, further stimulating poor respiration (Diest et al., 2001).

While respiration is an involuntary system, it can be cognitively controlled. Slowing respiration is a practice universally used in meditation and relaxation. Researchers have investigated the impact of breathing training through controlled, or paced, respiration in anxiety reduction, revealing positive outcomes. McCaul, Solomon, and Holmes (1979) found in their study of 105 males threatened with electric shock that those in the slow breathing condition (8 cycles per minute) had (a) reduced physiological arousal, measured by skin resistance and finger pulse volume; (b) a reduced respiration rate; and (c) reduced levels of state anxiety. In a similar study using anticipation of electric shock to induce state anxiety, Sakakibara and Hayano (1996) found that paced respiration at eight cycles per minute decreased the cardiac parasympathetic withdrawal response to the threat. In a study operating without induced anxiety and instead focusing on 36 individuals with high trait anxiety, researchers found the experimental group, who participated in 10 minutes of paced breathing at 10 cycles per minute, had greater reductions in state anxiety and skin conductance levels as compared to the control group (Clark & Hirschman, 1990). Thus, paced respiration does not only reduce adverse psychological variables, such as anxiety, but also has the ability to reduce adverse physiological variables, which have an effect on state anxiety as well.

For musicians specifically, recent studies provide statistically significant evidence linking performance anxiety with negative psychological and physiological effects (Studer, Danuser, et al., 2011; Studer et al., 2012). The first of two studies by Studer and two different groups of

colleagues investigated music performance anxiety and its association with hyperventilation complaints in 169 college musicians (Studer, Danuser, et al., 2011). They found a significant positive correlation between (a) hyperventilation complaints and negative feelings of music performance anxiety and (b) hyperventilation complaints and the perception of music performance anxiety being a problem (Studer, Danuser, et al., 2011). A later study by Studer and her colleagues (2012) confirmed these findings, but they also found the presence of an audience to be a significant variable in affecting physiological activation. In this study, 67 college music students performed for both an empty room and an audience of about 10 musicians including two experts who appeared to be evaluating the performances. The performances with the audience were associated with significantly higher physiological variables, including heart rate, minute ventilation, tidal volume variability, number of sighs, inspiratory volume, and mean inspiratory flow. During their performances for the audience, the participants exhibited more irregularity in their breathing patterns, which were slightly more thoracic, and experienced increased ventilation with largely unchanged timing parameters (Studer et al., 2012).

Treatment and Coping Strategies for Performance Anxiety

Unfortunately, some musicians have resorted to potentially harmful coping mechanisms to manage their performance anxiety. These include alcohol, nicotine, illicit drugs, or the use of beta-blockers or tranquilizers without a prescription (Studer, Gomez, et al., 2011). Substance-based coping mechanisms have been found to escalate with increasing professionalism in musicians and can have detrimental effects on health or lead to addiction, causing a serious occupational problem (Studer, Gomez, et al., 2011). Healthier, alternative options for coping are diverse including psychotherapy, pharmacological treatment, and self-help techniques. The

method of treatment is largely dependent on the type, cause, level, venue, and duration of the anxiety.

Cognitive and cognitive-behavioral therapies are widely considered to be the treatment of choice for performance anxiety (Bögels et al., 2010; Kenny, 2010). Pharmacological treatment, such as antidepressants or selective serotonin reuptake inhibitors, may be necessary, particularly with lasting or severe anxiety (e.g., trait anxiety). Beta-blockers, one type of pharmacological treatment, have been found to be extremely effective in reducing performance anxiety, specifically in musicians (Bögels et al., 2010; Studer, Gomez, et al., 2011). Pharmacological treatment may be used alone or in combination with psychotherapy (National Institute of Mental Health, n.d.); however, medication is not readily prescribed to any given musician who experiences performance anxiety as a physician or psychiatrist must deem their use necessary.

Coping strategies, such as self-help techniques, can be used for musicians who experience performance anxiety in less severe and/or in shorter periods. These techniques vary in level of engagement, ranging from more passive (e.g., cognitive reframing) to more active (e.g., physical activity). They may include individual counseling; exercise; yoga; breathing training; relaxation; journaling; meditation; natural substances, such as Bach's flowers or homeopathy; or even reaching out for support from classmates, supervisors, or faculty (Kenny, 2005; Smyth & Edwards, 2009; Sternbach, 2008; Studer, Gomez, et al., 2011).

An additional strategy to manage performance anxiety may include the use of music. Whether this is administered by a board-certified music therapist, or is self-directed, certain music stimuli can be helpful in decreasing state anxiety. As with the aforementioned techniques, musical strategies can also vary in the level of engagement. Passive engagement may include preferred music listening to promote relaxation or breathing exercises; whereas active

engagement may include playing instruments to preferred music or something more creative like improvisation.

Effect of Music on Psychological and Physiological Systems

Music has been recognized to have powerful effects on psychological and physiological systems for centuries (Davis, Gfeller, & Thaut, 2008; Standley, 1986). Dating back to the Egyptians, music was used to influence fertility of women, while Persians used the sound of the lute to treat illnesses. The Hebrews recorded the use of music to treat mental and physical ailments, most famously David playing the harp for King Saul to absolve his despondent moods (Cook, 1981). However, in substantiating the true effects of music on psychological and physiological systems, referral to research studying these phenomena systematically is a necessity.

Since the 1980's, a large body of research has indicated positive outcomes when using music stimuli to affect the body in a physiological manner. These studies include using music to cue respiration (i.e., breathing training), resulting in decreased and/or regulated respiratory patterns (Chlan, 1998; Fratianne et al., 2001; Good, Anderson, Stanton-Hicks, Grass, & Makii, 2002; Phipps, Carroll, & Tsiantoulas, 2010; Tan, Yowler, Super, & Fratianne, 2010; White, 1992). In addition to respiration, other involuntary systems controlled by the autonomic nervous system have been cited to be influenced by music including significantly decreased heart rate (Chlan, 1998; Good et al., 2002; Knight, 2001; Oyama, Sato, Kudo, Spintge, & Droh, 1987; Phipps et al., 2010; Smolen, Topp, & Singer, 2002; White, 1992) and blood pressure (Ferrer, 2007; Knight, 2001; Oyama et al., 1987; Smolen et al., 2002; Updike, 1990). However, there is discrepancy in the literature regarding the efficacy of music stimuli on decreasing heart rate and blood pressure, as a majority of studies report insignificant or inconsistent results. This is

potentially due to an inverse relationship between the psychological and physiological arousal response to music (Davis & Thaut, 1989; Hanser, 1985). For example, a psychological response (e.g., feelings of relaxation) may contradict an individual's physiological response (e.g., an increase in heart rate or blood pressure) due to a slight arousal in the autonomic nervous system as a result of the enjoyment of the music.

Skin conductance, a measurement of electrical conductance of the skin's surface that varies with moisture levels produced by sweat glands, has also been studied in relation to music stimuli (Edwards, Eagle, Pennebaker, & Tunks, 1991; Gomez & Danuser, 2004). Sweat glands are moderated by the sympathetic nervous system, thus skin conductance tests are considered an indicator of both psychological and physiological arousal. Edwards et al. (1991) found increased skin conductance levels were associated with loud music (>80 dB) performed at a fast tempo (132-156 beats per minute) with driving, syncopated rhythms and variations in key, melodic lines, meter, and orchestration. In contrast, decreased skin conductance levels were associated with soft music (<65 dB) at a slow tempo (<60 beats per minute), consisting of sustained string textures, harmonic cadences, and slow harmonic rhythm (Edwards et al., 1991). Gomez and Danuser (2004) found that musical excerpts that elicited higher psychological arousal resulted in higher skin conductance levels when compared to low arousal musical excerpts. Furthermore, noise excerpts (e.g., sounds of cheering spectators, sirens, a crowded city, and a waterfall) were not associated with a change in skin conductance levels regardless of psychological arousal levels (Gomez & Danuser, 2004). This brings up the interesting point that psychological and physiological responses to auditory stimuli can differ across individuals for a variety of reasons. Thus, it is important to consider the qualities and elements of music as well as individual

preference when using music to elicit a therapeutic change, a topic that will be discussed in the next section.

Chemical levels in the body are also influenced by music stimuli including significant increases in oxygen saturation (Özer, Karaman Özlü, Arslan, & Günes, 2013); partial pressure of oxygen (PaO₂); and oxytocin, an anti-stress factor (Nilsson, 2009b). In addition, cortisol levels—as regulated by the hypothalamus—can be significantly decreased with relaxing music (McKinney, Antoni, Kumar, Tims, & McCabe, 1997; Nilsson, 2009a). The hypothalamus is an important brain mechanism that activates the endocrine system and, in this case, the release of cortisol. Since cortisol is released in response to a stressor, decreased levels of cortisol may indicate management of anxiety.

Emotions, such as state anxiety, are highly associated with a host of autonomic processes that regulate physiological responses in the body. Thus, it is important to consider how music—which has powerful effects on emotions—influences psychological systems. Most obviously, music can provide benefits of relaxation, a sensation many people specifically use music to achieve in their personal lives. Clinically, music has been attributed to promoting increased levels of relaxation in surgical procedures (Chlan, 1998; Heiser, Chiles, Fudge, & Gray, 1997; Nilsson, 2009a, 2009b; Walworth et al., 2008) and bone marrow transplants (Boldt, 1996) as well as reducing the amount of analgesics used in colonoscopy studies (Schiemann, Gross, Reuter, & Kellner, 2002; Smolen et al., 2002). McKinney et al. (1997) also found use of the Bonny Method of Guided Imagery and Music significantly decreased reports of depression and fatigue in 28 healthy adults after six bi-weekly sessions.

While these previously discussed studies provide strong implications for the use of music in eliciting positive psychological and physiological responses, it is critical to understand that

some of the aforementioned reports—and a majority in the larger body of research studying music’s relationship with psychological and physiological responses—only employed the use of music as an ambient and adjunct modality (e.g., listening to music via headphones from a CD player). This is different than, and frequently mislabeled as, music therapy. According to the American Music Therapy Association (2014b), “Music therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program” (What is music therapy, para. 1). In other words, music therapy requires facilitation of treatment by a board-certified music therapist who uses music interventions to reach functional goals like reduction of state anxiety.

Music Stimuli Used to Reduce State Anxiety

Standard practice in music therapy is client-centered care. One example of client-centered care is providing a client with choices during the music therapy session. Considering loss of control is a large contributor to anxiety, providing clients with an opportunity for control, such as the option to choose a song, may help alleviate anxiety. Thaut (2005) discusses preferred music, theorizing that idiosyncratic psychophysiological responses to music are evident; these individual responses play a large role in the efficacy of *relaxation* music if the listener does not prefer it. This theory is explained by one of Thaut’s earlier studies with Davis (1989), in which they investigated the influence of preferred music on state anxiety, relaxation, and physiological responses. They found participant-selected music, which included selections from classical, soft rock, hard rock, folk, Christian, and jazz genres with a variety of dynamic and structural features, such as tempo, loudness, and rhythm, significantly reduced levels of state anxiety (Davis & Thaut, 1989). These conclusions are similar to findings from other studies on music preference

and relaxation (Salamon, Bernstein, Kim, Kim, & Stefano, 2003; Stratton & Zalanowski, 1984; Walworth, 2003). It is interesting to note that the characteristics of participants' selections defied the traditional categorization of *relaxation* music (Davis & Thaut, 1989). Davis and Thaut (1989) summarized that preference, familiarity, cultural context, and past experiences may contribute to what music listeners perceive and experience as most relaxing.

However, sometimes music therapy interventions, such as progressive muscle relaxation, music-based imagery, or deep breathing—particularly when using live music—do not lend themselves to client-selected music due to a wide range of potential genres, inappropriate tempos, and rhythmic irregularities. Furthermore, client-preference may not be known or appropriate due to a myriad of reasons including limited cognitive function as a result of age, injury, disability, or dementia; level of sedation; high emotional arousal; and therapeutic considerations, such as group sessions or very brief or impromptu interventions.

Therapeutic function of music for anxiety reduction. Anxiety, stress, and tension, are words often used interchangeably in popular and research literature, and in particular, music therapy research, when discussing music to ameliorate these symptoms. Likewise, relaxing music, soothing music, and easy listening music are descriptors of genres or types of music that have long been generalized to address these issues; however, in the profession of music therapy, it is critical to define the musical characteristics of this *type* of music and how they specifically elicit parasympathetic responses contributing to the intended goal of decreasing anxiety. Additionally, providing an evidence-based rationale of the goal-oriented structure of musical elements (i.e., the therapeutic function of music) helps further delineate music therapy from ambient music listening (Hanson-Abromeit, in press).

Many researchers have reported the use of relaxing, soothing, or easy listening music, often categorizing it as sedative and describing similar musical characteristics. Standley (1986) compiled several studies on respiration and heart rate and found that in general, slow, quiet, non-vocal music lowers physiological responses associated with stress while faster music heightens those responses. In a later meta-analysis, Pelletier (2004) suggested the use of slow tempos, low pitches, string compositions, regular rhythmic patterns, consistent volume, and no lyrics for stress reduction. Fratianne et al. (2001) documented a significant decrease in pain using chordal accompaniments, simple melodies in a comfortable key for the music therapist, moderate to low volumes, and slow and gradually reduced tempos to 60 beats per minute to cue breathing. Similarly to this study, Nilsson (2009b) reported use of music between 60-80 beats per minute at a volume between 50-60 dB, in a study revealing significant increases in relaxation ratings. Gadberry (2011) also facilitated a tempo in this range, specifically 66 beats per minute played on a sub-contra *C* bass tone bar, and reported significantly reduced anxiety. In an amplitude preference study, Staum and Brotons (2000) reported softer music (60-70 dB) is overwhelmingly preferred for purposes of relaxation. Robb et al. (1995) provides a summary of musical characteristics appropriate for relaxation interventions for anxiety management, which further confirms efficacy of many of the musical elements reported in the aforementioned studies, including:

- slow to moderate tempos, at or below a resting heart rate, at 72 beats per minute or less;
- rhythms that are regular, smooth, and flowing without sudden changes;
- melodies that are slow, sustained, and stepwise;
- pitch that is predominantly low, as high pitches tend to elicit tension;
- dynamics that are predictable, in the soft to moderately loud range;

- softer tone quality instruments; and
- harmonies that are pleasing.

Many instruments could be utilized when following these recommendations. These include guitar, strings, harp, and tone chimes. An additional group of instruments—often called “Orff instruments”—would also be appropriate. Orff instruments are primarily barred instruments, which include xylophones, metallaphones, glockenspiels, and bass bars. In particular, xylophones, metallaphones, and bass bars provide a soft tone quality, are naturally in the soft to moderately loud range, and can be played together to create a pleasing harmony. A “bordun” is often used when playing Orff instruments. Essentially, this is a repeating, steady rhythmic pattern played on a lower range instrument (e.g., bass bars), often using the first, fifth, and eighth tones in a diatonic scale. This pattern provides a smooth, predictable pulse, and can be played in the recommended tempo range. Lastly, bars on the metallaphone and xylophone can be removed to maintain a specific sound or range. Upon removal of the fourth and seventh tone bars, a pentatonic scale is created. The pentatonic scale is predictable; easy to play for both experienced and inexperienced musicians; and devoid of a major or minor modality, which provides a pleasing harmony when paired with a bordun.

Music Therapy Interventions to Address State Anxiety

In light of decades of research on the use of music to affect psychological and physiological variables, particularly increased arousal of the parasympathetic nervous system to decrease anxiety, music therapy is becoming increasingly integrated in clinical settings where anxiety management is of concern. The majority of research in this area is based in medical venues due to the many health and quality of life concerns that accompany high levels of state anxiety before, during, and/or after medical care (Pelletier, 2004; Robb et al., 2008; Robb et al.,

1995; Walworth et al., 2008). Considering the positive effects music therapy has on anticipatory, or preoperative, anxiety in the medical environment (Chetta, 1981; Robb et al., 1995), the use of music seems to be a promising tool that music therapy college students can use to manage their own anticipatory anxiety prior to important examinations or musical assessments.

Music, unlike any other stimulus, results in diffuse activation of the brain, promoting a level of arousal unattainable through any other treatment for anxiety. Psychological arousal via complex musical elements, such as pitch, rhythm, tempo, and harmony, can support emotional expression and improve affective responses when facilitated within a structured therapeutic relationship. These positive responses promote cognitive restructuring of stressful situations (Ghetti, 2011) and thus an opportunity for the development of coping skills, which is an integral component to dealing with a stressor (Ridner, 2004).

Music therapy for the treatment of state anxiety consists of a range of approaches, varying from passive music listening to more active, or interactive, interventions. Pelletier (2004) conducted a meta-analysis of 22 quantitative studies, and found that music interventions combined with relaxation techniques significantly decreased arousal due to stress. Common music interventions for state anxiety include listening to live music, music-based imagery, and music assisted progressive muscle relaxation. Live music listening interventions can range from passive to more active. A passive intervention may consist of the music therapist playing the guitar—in accordance with the therapeutic function of music for relaxation described earlier—to promote rest, and potentially, sleep. A more active intervention may consist of the client choosing a genre of music or a specific song and singing or playing an instrument along with the therapist, who may accompany on guitar or piano. Ferrer (2007) reported significant positive effects on anxiety, fear, fatigue, and relaxation after 20 minutes of live music listening in patients

receiving chemotherapy treatment. In music-based imagery, the client shares information about a special place with the music therapist, including as much detail as possible pertaining to the five senses specific to the scenario. The therapist then plays sedative music while describing, or improvising lyrics about, the special place, and perhaps even provides deep breathing and/or muscle relaxation cues. Music-based imagery can help individuals shift attention away from negative feelings, such as anxiety, to more positive feelings, while improving physiological variables, including pain, and psychological variables such as coping skills (Fratianne et al., 2001; Tan et al., 2010). Music assisted progressive muscle relaxation involves therapist-directed instruction combined with music to cue the tensing and releasing of muscle groups and usually incorporates diaphragmatic breathing. Robb et al. (1995) found that these three techniques have the ability to decrease perceived anxiety, increase relaxation, increase coping strategies, and increase emotional support to the patient and family.

Active music engagement. Active music engagement (AME), another approach that can be used to decrease state anxiety, involves physically active music making. AME is an interactive music therapy approach in which a music therapist structures and promotes client engagement through singing, moving, or playing instruments. AME provides opportunities for autonomy and client-involvement in assessment and treatment in an enjoyable, sensory stimulating, and positive experience. Kruse (2003) found that 82% of music therapists in oncology settings use instrument play in anxiety management. Ghetti (2011) conducted a study with liver and kidney transplant patients promoting AME through instrument play during singing of client-preferred music. After one 60-minute session, Ghetti (2011) found the individuals in the music group compared to the control group had significant decreases in negative affect and pain perception, two psychological contributors and indicators of anxiety. Walworth et al. (2008)

found that interactive music therapy, including singing and instrument play, had significant positive effects on patients' anxiety, perception of hospitalization, relaxation, and stress levels, as well as a positive effect on family members, who also felt less anxious as a result of the interventions. Robb et al. (2008) conducted an AME study with 83 four to seven year old cancer patients. Compared to music listening and audio storybooks, participation in the AME group led to significantly higher coping-related behaviors—which can serve as indicators of anxiety management—including positive facial affect, behavior engagement, and initiation (Robb et al., 2008).

An extension of AME interventions to further promote anxiety reduction often involves cognitive processing and emotional expression; however, clients often have great difficulty in verbally expressing or describing fears associated with their anxiety. Thus, specific AME interventions, such as instrumental improvisation, provide clients opportunities to communicate and experience nonmusical thoughts and feelings related to their anxiety. Aside from the expected anxiety relief and relaxation response directly resulting from the musical experience, the musical play often elicits verbal processing with the therapist. A qualitative study by Pothoulaki, MacDonald, and Flowers (2012) strongly supports the use of AME in improving psychological issues, such as stress, anxiety, relaxation, and expression, related to cancer. In their study of nine cancer patients using improvisational music therapy techniques, five participants reported that the sessions were stress relieving. In addition, many themes emerged including (a) sessions enabled participants to relax and allowed them to dedicate time to themselves; (b) participants found musical communication was more appealing and easier than verbal communication; and (c) participants were able to express themselves without worry and

felt liberated in expressing themselves musically, as they did not have to adhere to the same rules for verbal communication (Pothoulaki et al., 2012).

Active music engagement encourages the client to engage both physically and psychologically, creating a whole-person activity. In addition, interactive interventions promote opportunities to further develop the client-therapist relationship, particularly via nonverbal communication in improvisatory-based interventions. Lastly, AME provides lucrative assessment prospects for the therapist; physical movement, eye contact, and musical production can be observed to assess engagement, communication, and expression—standard behaviors in evaluating coping strategies for anxiety.

Breathing training. As discussed earlier, higher than average respiration rates not only indicate, but exacerbate state anxiety. Indeed, certain types of music have been reported to effectively produce counter arousal and promote slow, deep-diaphragmatic breathing (Fried, 1990). With this understanding, it is important to consider how music therapy can address the symptom of heightened respiration when targeting anxiety reduction. The principle of entrainment is responsible for reducing respiration rate via an external auditory stimulus (e.g., music), as evidenced by researchers investigating this phenomenon (Good et al., 2002; Phipps et al., 2010).

Positive effects on anxiety-related psychological and physiological variables have been documented in experimental research incorporating breathing interventions (Chlan, 1998; Fratianne et al., 2001; Tan et al., 2010). These effects include significant reductions in anxiety and respiration rates by merely listening to music at a rate of 60-80 beats per minute (Chlan, 1998) and significant reductions in pain and reduced levels of anxiety when given specific instruction to breathe deeply and evenly at the same speed of the music (Fratianne et al., 2001;

Tan et al., 2010). Combined with the physical decrease of muscular tension elicited by music-assisted relaxation, deep and even respiration reinstates a steady supply of oxygen to muscle tissue (Davis et al., 2008), a factor that can impact anxiety perception.

Orff Schulwerk

Orff Schulwerk (Schoolwork) is a common international approach to music education founded in the philosophy of learning by doing (Colwell et al., 2008). Carl Orff, famous for the masterpiece *Carmina Burana*, and Gunild Keetman developed this approach in the 1920's (American Orff-Schulwerk Association, 2014c). Rhythm, the foundation of the elemental music used in Orff Schulwerk, allows everyone—regardless of ability or disability—to participate (Colwell et al., 2008). Further, active music making is central to the Orff approach, which incorporates singing, chanting, playing instruments (e.g., glockenspiels, xylophones, metallaphones, drums), movement, and dance in a process-oriented method to build musicianship (American Orff-Schulwerk Association, 2014a). The Orff approach is not intended to develop highly accomplished performers as the *process* of development predominates the *performance* (American Orff-Schulwerk Association, 2014b). The Orff Schulwerk music and movement pedagogy was created, and is believed, to extend far beyond the development of artistic skill. This wider development encompasses intellectual, social, emotional, and aesthetic skill building, uniquely preparing individuals to solve problems in many other contexts outside of music (American Orff-Schulwerk Association, 2014a).

Orff approach in music therapy. Since 1962, music educators have recognized the benefits of using the Orff Schulwerk approach in reaching functional goals with many populations for whom music therapists also serve. These include individuals with developmental disabilities, such as Down syndrome and autism; behavioral challenges; physical disabilities; and

neurological disorders (Colwell et al., 2008). In fact, many comparisons can be made between Orff's philosophy of music education and the philosophy of music therapy, providing strong support for an Orff-based music therapy model. Colwell (2005) summarizes the aspects of the Orff Schulwerk approach that naturally support music therapy, including:

- allowing everyone to participate in the music;
- beginning where the individual is developmentally (i.e., the iso principle);
- using a multisensory approach;
- moving from the experiential (sound) to the conceptual (symbol);
- designing experiences that are success-oriented;
- using culturally specific material;
- using rhythm as the underlying foundation of elemental music; and
- focusing on the process rather than the product.

Furthermore, in a therapeutic context, Orff-based music therapy can address many of the same goals as traditional music therapy including reducing anxiety, increasing emotional expression, elevating mood, and improving coping skills (Colwell, 2009). Although limited research has been conducted using an Orff-based music therapy approach, the following preliminary studies provide evidence of positive effects in various domains.

Hilliard (2007) investigated the effects of Orff-based music therapy on childhood grief symptoms and behaviors. Participants were 26 children, ages 5-11, who experienced the death of a loved one within the past two years. There were two experimental conditions consisting of an Orff-based music therapy group and a social work group—both receiving eight, weekly, one-hour sessions—and a wait-list control group. Music therapy interventions included improvisation, grief-themed chants and songs, and songwriting used to accompany bereavement-

related stories. Participants in the social work group significantly improved their behaviors (e.g., anger issues, physical aggression, lying, and strange actions), whereas the Orff-based music therapy group significantly improved in both their behaviors and grief symptoms. Expectedly, the wait list control group made no significant improvements.

A similar study conducted by Register and Hilliard (2008) also investigated the use of Orff-based music therapy to assist children in the grief process. An eight-week music curriculum was developed and implemented, consisting of weekly topics introduced via Orff interventions followed by processing within a cognitive-behavioral music therapy model. Interventions included a feelings poem, a death and change chant, a remembrance improvisation, and a goodbye song. Informal data were collected and indicated positive responses including consistent attendance, positive verbalizations, and on-task behaviors (Register & Hilliard, 2008).

More recently, a study by Colwell et al. (2013) investigated the impact of three types of music therapy interventions (listening, composition, and Orff-based) on physiological and psychosocial behaviors of 32 hospitalized children, ages 6-17. Each participant received one music therapy session, which lasted no longer than 45 minutes. Condition 1 provided preferred music listening via an iPod®; condition 2 targeted an instrumental composition using a computer program, followed by a CD label design and description; and condition 3 facilitated the Orff process through instrument play, chanting, and body percussion to supplement the rhythmic reading of a book. Comparative trends indicated the Orff-based condition showed the greatest decrease in state anxiety, the most eye contact with the therapist, the most positive facial affect of participants, the highest incidence of on-task behavior, and higher oxygen saturation among the three conditions (Colwell et al., 2013).

In a music therapy setting, the Orff Schulwerk approach provides natural opportunities for autonomy, client-control, and involvement in the therapeutic process (Colwell, 2009). Additionally, the Orff Schulwerk process focuses on using structured musical experiences to improvise and create (Colwell et al., 2008). The exploration of worries, fears, and anxiety in this creative yet structured musical environment provides a medium for emotional processing, a key component in anxiety reduction (Foa & Kozak, 1986).

Purpose of Study

State anxiety in musicians is elevated in situations that involve high ego investment and evaluative threat (Kenny, 2010). While music therapists are not performing in a clinical setting the same way music performers do for an audience, they can still experience evaluative threat from clients, family, or staff, as well as high ego investment related to musical skills, which may be increased when playing in genres or on instruments with which they are less comfortable. Specifically in music therapy students, high ego investment and evaluative threat is prevalent during clinical musicianship assessments in college, for which they must demonstrate proficiency in various musical and clinical skills for faculty and supervisors.

Participating in these assessments has long been an anxiety provoking experience for music therapy students. It is important they manage their anxiety during this experience in order to demonstrate their true skill set as well as proceed academically. Furthermore, it is critical music therapy students learn and establish healthy coping strategies for this anxiety during college in preparation to effectively manage performance anxiety they may experience as a professional music therapist.

Summarizing the proceeding review of literature, it is clearly established that lowering respiration rate can lower anxiety, and distraction, such as active music engagement, can

alleviate feelings of anxiety. Orff-based music therapy is one approach that can facilitate both of these experiences. Orff-based music therapy interventions are hypothesized to be effective for reducing state anxiety due to their provision of implicit opportunities for emotional expression, active engagement in the treatment process, and the development of coping skills—three areas associated with positive effects on anxiety. Thus, the purpose of this study was to evaluate the effectiveness of Orff-based music therapy as a potential music intervention used to decrease state anxiety of music therapy students.

The following research questions were addressed:

1. Does either paced breathing cued by Orff bass bars or active music engagement via Orff improvisation have an effect on state anxiety?
2. Is a more passive (cued breathing) or active (improvisation) intervention more effective in reducing state anxiety?

Chapter 3

Method

Participants, Recruitment, and Informed Consent

Participants ($N = 32$) were undergraduate ($n = 21$) and graduate-equivalency ($n = 11$) music therapy students from a large Midwestern university. All participants were recruited from a departmental sign-up sheet for a music therapy clinical musicianship assessment occurring at the end of the semester during final examination week. Students were signed up to take one of the four required assessments for the music therapy program. These assessments are pass/fail and serve as checkpoints, determining a student's skill level, progress from the previous assessment, and whether they are permitted to continue on in their planned degree sequence. It is essential that students meticulously plan and prepare the presentation of their skills for the assessment, which is presented to a panel of faculty and practicum supervisors. Based on the researcher's experience and conversations with students and professors, these assessments seem to be among the most anxiety-provoking academic exercises in this particular music therapy program.

An email request for volunteer participation was sent to all students who were signed up for the assessment. The inclusion criteria for students were (a) music therapy major at the undergraduate or graduate level at the university the study was being conducted, and (b) participating in the clinical musicianship assessment during the period the study was being conducted. There were no exclusionary criteria for the present study. Interested students were asked to arrive at least 20 minutes prior to their scheduled assessment to allow ample time to participate in the study. Participants were required to read the information statement prior to the study beginning. This study was conducted with permission from the Human Subjects Committee.

Using an online random number generator program (Random.org), participants were randomly assigned to either experimental Group 1 (cued breathing), a breathing training condition; or experimental Group 2 (improvisation), an active music engagement condition. Group 1 (cued breathing) ($n = 16$) consisted of 15 females and 1 male between the ages of 19-29 ($M = 22.31$, $SD = 3.05$). Group 2 (improvisation) ($n = 16$) consisted of all females between the ages of 19-25 ($M = 21$, $SD = 2.54$). The disparate ratio of females to males in this sample (i.e., 31:1) is consistent with the professional field of music therapy, which was reported to have a female to male ratio of 7:1 in 2013 (American Music Therapy Association, 2013).

Setting

The study was conducted in a private music therapy clinical room on the university campus. The room contained a digital piano, a drum set, a small table, file cabinets, and a two-way mirror into an observation booth. Although it was not used for this study, the two-way mirror could only be seen through from inside the observation booth adjacent to the clinic room. The lights in the room were dimmed for both experimental conditions to cue a relaxation response. The clinic room used for this study was located adjacent to a larger clinic room where the clinical musicianship assessment took place. This occasionally resulted in some minimal noise (i.e., group laughter, singing, playing), but the researcher's observations did not seem to indicate the noise had a negative distracting effect on the participants.

Materials

Materials used for the study included three Studio 49 Orff resonator bars: (a) *C* contrabass bar, (b) *G* contrabass bar, and (c) *C* bass bar, and one Studio 49 soprano xylophone (spanning an octave and a sixth) preset in a *C* pentatonic scale by removing the fourth and seventh tone bars. Two large yarn mallets were used to play the bass bars, while two small felt

mallets were used for the xylophone. The researcher used a Bluetooth ear device to play a metronome sound provided by an iPhone® using the application MetroTimer. The sound of the metronome was only used for the researcher and was not audible to the participant. The participants sat in a Wenger® musician chair, while the researcher sat on a low stool behind the bass bars approximately four feet from the participant. Participants in Group 2 (improvisation) sat behind the soprano xylophone, which was placed on an Orff instrument stand at an appropriate playing height and distance from the participant.

Measurements

State anxiety, the dependent variable for both experimental conditions, was assessed using the state portion (Form Y-1) of the *Spielberger State Trait Anxiety Inventory* (STAI) (Spielberger, 1983). The STAI is a 20-item self-report questionnaire that evaluates how respondents feel at that particular moment and was administered pre and post treatment intervention. The STAI is a norm referenced test and has been used extensively in research, clinical practice, and recently in determining levels of music performance anxiety (Kenny, Fortune, & Ackermann, 2013; Studer, Danuser, et al., 2011; Studer et al., 2012).

Design and Data Analysis

This study used a randomized pretest/posttest between-subject design with two experimental groups (Group 1: cued breathing, Group 2: improvisation). Data were analyzed using a one-way repeated measures ANOVA using SPSS version 21, alpha level set at .05.

Procedure

The study was conducted by a second year music therapy masters student. The researcher has extensive experience with Orff Schulwerk from his Bachelor of Music Education degree as well as specific clinical experience in adapting the Orff Schulwerk process to achieve music

therapy outcomes of anxiety reduction in adults and children. Each participant was tested individually during a single three-minute intervention before the participant's scheduled clinical musicianship assessment. Upon arrival, participants were greeted by the researcher and directed to the study room where they were instructed to read the information statement. After the researcher confirmed the participant read the information statement, the participant was provided with a blank copy of the statement and then instructed to complete the state portion of the STAI, indicating their current level of anxiety as a pretest measure. Upon completion, the researcher collected the STAI. To ensure uniform delivery of the experiment across participants, the researcher proceeded with a brief instructional script appropriate to the participant's assigned experimental group before beginning the 3-minute condition.

Group 1 (cued breathing)

First, I'd like you to close your eyes and get comfortable in your chair, with your feet flat on the floor. For the next three minutes, I'm going to play a repeating pattern on the Orff bass bars, which will cue your breathing. As the notes ascend, you will inhale for a total of three beats, and as they descend you will exhale for four beats. Try to breathe deeply and evenly with the music. You will breathe in through your nose and out through pursed lips, similar to blowing out a candle. Now, listen to the pattern a couple of times before we begin (*play bordun twice, then start three-minute timer*). In, 2, 3, and out, 2, 3, 4. In...(*further cueing provided as needed*). In for the last breath, and open your eyes (*spoken rhythmically with bordun to end condition*).

Group 2 (improvisation)

First, I'd like you to get comfortable in your chair, with your feet flat on the floor. Feel free to move the xylophone closer if you'd like. You can hold onto these mallets, one in

each hand. For the next three minutes, I'm going to play a repeating pattern on the Orff bass bars, which will serve as an accompaniment to your improvisatory playing on the xylophone. You can play however you'd like, either alternating between hands or with both hands together, and as fast or as slow as you want. Any note you play will sound good. Are you ready? Ok, listen to one pattern, and then I'll cue you to play (*play bordun once, then start three-minute timer*). Last time now, and stop (*spoken rhythmically with bordun to end condition*).

After scripted instructions were read to each participant, further appropriate instruction was provided as needed throughout the experimental intervention, such as “in...and out *through the lips*” or “try playing with *both* hands.” After the rhythmic verbal prompt to conclude the three-minute interventions, participants were asked to complete the state portion of the STAI as a posttest measure.

The crossover bordun for Group 1 (cued breathing) (see Figure 1) was designed to provide an auditory cue for paced breathing with inhalation during the melodic ascent and exhalation during the descent. The bordun was played at 49 beats per minute with instruction to inhale for three beats and exhale for four beats, resulting in seven cycles per minute, a rate at the low end of a healthy adult resting respiration rate (MedlinePlus, 2011; Ragnarsdóttir & Kristinsdottir, 2005) At this tempo, a three beat inhale followed by a four beat exhale is equivalent to a 1:1.33 inspiration/expiration ratio, which is consistent with previous research of healthy adults ages 20-69 (Jammes, 1979; Ragnarsdóttir & Kristinsdottir, 2005; Tobin et al., 1983) and reference values in the medical literature (Barrett, Barman, Boitano, & Brooks, 2012).

Group 1 Orff Crossover Bordun



Figure 1. Orff bass bar bordun for Group 1 (cued breathing).

The crossover bordun for Group 2 (improvisation) (see Figure 2) was slightly modified from Group 1 (cued breathing). First, the meter was in a 4/4 time signature for both measures. This standard time signature provides a more natural pattern than the mixed meter used for breathing in Group 1, thus providing predictability and ease in musical improvisation for the participant. Second, the bordun was played at 60 beats per minute, a tempo associated with the low end of a normal resting heart rate (MedlinePlus, 2013), and cited in the range of tempos (60-72 beats per minute) most appropriate for promoting a relaxation response (Robb et al., 1995).

Group 2 Orff Crossover Bordun

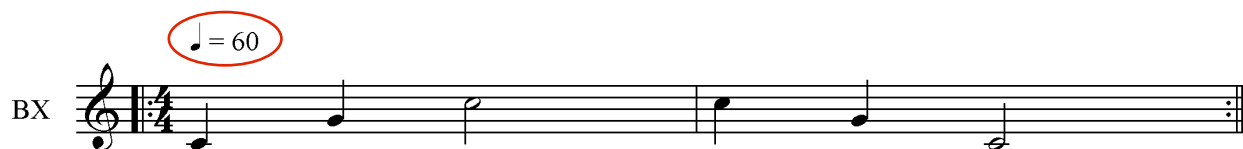


Figure 2. Orff bass bar bordun for Group 2 (improvisation).

Chapter 4

Results

A one-way repeated measures analysis of variance with time (pretest to posttest) as the within subjects variable and experimental group (cued breathing or improvisation) as the between subjects variable was conducted to examine potential differences in anxiety scores from pretest to posttest and potential differences between the two music interventions.

Does either paced breathing cued by Orff bass bars or active music engagement via Orff improvisation have an effect on state anxiety?

Results from the ANOVA demonstrate a significant main effect for time $F(1, 30) = 91.04, p < .001$, indicating both conditions produced a statistically significant decrease in anxiety (Pretest $M = 52.59, SD = 10.14$ and Posttest $M = 40.06, SD = 9.46$).

Is a more passive (cued breathing) or active (improvisation) intervention more effective in reducing state anxiety?

Although there was a significant difference from pre- to posttest, the interaction between time and experimental group was not found to be statistically significant $F(1, 30) = 0.54, p = .466$, indicating Group 1 (cued breathing) was not significantly different in reducing anxiety (Pretest $M = 52.75, SD = 9.92$ and Posttest $M = 39.25, SD = 11.46$) compared to Group 2 (improvisation) (Pretest $M = 52.44, SD = 10.69$ and Posttest $M = 40.88, SD = 7.23$). Figure 3 depicts group mean scores from pretest to posttest as well as reference lines indicating normative mean scores for male and female colleges students, which will be discussed in the following chapter.

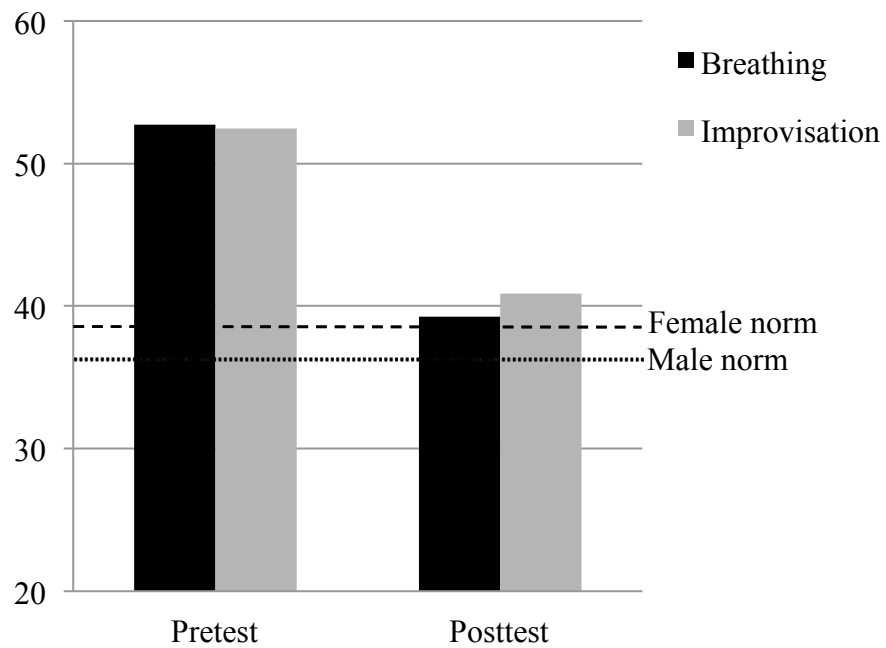


Figure 3. Group mean scores on the STAI from pretest to posttest. Reference lines indicate the normative mean scores for male ($M = 36.47$) and female ($M = 38.76$) college students as documented by Spielberger (1983).

Chapter 5

Discussion

The purpose of this study was to evaluate the effectiveness of Orff-based music therapy as a potential music intervention used to decrease state anxiety of music therapy students. This study examined the following research questions: (1) Does either paced breathing cued by Orff bass bars or active music engagement via Orff improvisation have an effect on state anxiety?, and (2) Is a more passive (cued breathing) or active (improvisation) intervention more effective in reducing state anxiety? When addressing research question one, results of this study show that participants in both conditions experienced a significant decrease in anxiety as measured by the state portion of the STAI. Regarding the second research question, neither intervention (cued breathing or improvisation) emerged as more effective than the other.

Scores on the state portion of the STAI can range from 20-80, with a score of 20 indicating the absence of state anxiety and 80 indicating a high level of state anxiety (Spielberger, 1983). All but one participant (who reported an unchanged score at posttest) in the present study reported a decreased anxiety score after participating in the three-minute intervention. The difference scores from pretest to posttest ranged from 0-29, with an average decrease of 12.53 across participants. The mean posttest scores for Group 1 (cued breathing) ($M = 39.25$) and Group 2 (improvisation) ($M = 40.88$) appear to be similar to the normative mean scores for male ($M = 36.47$, $SD = 10.02$) and female ($M = 38.76$, $SD = 11.95$) college students, as reported by Spielberger (1983) (see Figure 3). Alternatively, pretest mean scores for Group 1 (cued breathing) ($M = 52.75$) and Group 2 (improvisation) ($M = 52.44$) were more than one standard deviation above these norm mean scores for male ($M = 36.47$, $SD = 10.02$) and female ($M = 38.76$, $SD = 11.95$) college students (Spielberger, 1983). This information suggests that the

clinical musicianship assessment, which students were scheduled to take after participating in this study, is indeed an anxiety provoking experience.

The researcher's informal observations during data collection also present valuable information related to the presenting anxiety of students participating in this particular clinical musicianship assessment. One participant who was signed up to take the fourth, and final, clinical musicianship assessment—which determines whether she would be approved to begin her internship—reported she “couldn't sleep” the night before. She arrived to the study room reviewing her materials for the assessment and stated “It would be a nightmare for me and my family if I didn't pass my quiz out because I already paid so much money.” A different participant stated, “I just want this to be over.” while another reported she felt “nauseated from stress.” Two other participants later exited the clinical musicianship assessment room crying.

Informal observations after the experimental interventions also seem to be consistent with the results of this study. Many participants exhibited signs of increased relaxation (i.e., a pleasant affect, calm speaking voice, or physical stillness) and/or verbalized comments about feeling better or how they were more relaxed. Professors who were present for the clinical musicianship assessment of those participants' who completed this study also made comments related to an improved affect and how, in general, they have never seen students come into the room so relaxed.

Limitations

While the present study provides preliminary support for Orff-based music interventions to address state anxiety, it is important to consider limitations within the study. First and foremost, the sample size ($N = 32$) was relatively small, and all participants were from the same university, making it difficult to generalize findings to music therapy students attending other

universities. In addition, there were two other studies related to anxiety and stress soliciting participants from the same pool at the time this study was conducted. The researcher was also a peer to the participants and a fellow classmate to many. While the participants were informed that their information would be kept confidential, and that honest and candid responses on the STAI are most helpful, this relationship may have impacted the self-reported anxiety ratings due to the variability among participants' familiarity and/or comfort level with this researcher. Furthermore, the participants—as practitioners themselves who are educated on music therapy research—may have felt a sense to “confirm” the hypothesis for the intervention, potentially skewing their subjective reports of state anxiety. Lastly, there may have been potential distraction elicited by ambient noise (i.e., group laughter, singing, playing) audible from the adjacent room where the clinical musicianship assessment took place. While participants did not appear to be negatively distracted by the occasional noise, a few commented, laughed, or stopped to listen.

Suggestions for Future Research

The researcher suggests some changes and additions to this study's design, procedures, measures, and participants. First and foremost, the author recommends altering the design of the study by repeating the study with a larger sample size and adding a third group to serve as a control, examining if three minutes of deep breathing without auditory cueing or perhaps completing a three-minute, non-musical task has an effect on state anxiety.

Secondly, the researcher suggests changes to the study's procedures by expanding and adapting the interventions. A three-minute intervention is rather short in a true clinical setting. It would be interesting to increase the duration of the protocols used in this study to determine whether a longer intervention is correlated with a greater decrease in anxiety. Thus, the author

recommends expanding the interventions by developing an Orff *process* and incorporating other Orff *media*.

The Orff Schulwerk approach to music education or music therapy is sometimes misunderstood simply as the use of "Orff instruments" such as glockenspiels, xylophones, and metallaphones; however, a true Orff Schulwerk approach follows a *process* and includes Orff *media* (Colwell et al., 2008; Shamrock, 1986). The Orff media consists of speech, movement, singing, and playing instruments (American Orff-Schulwerk Association, 2014d; Colwell et al., 2008). Speech may include chants or poetry, and singing may include call and response, singing games, folk songs, or composed songs. Movement includes body percussion as well as dance: interpretive, improvisational, folk, or choreographed. Instruments include xylophones, metallaphones, glockenspiels, unpitched percussion, and recorders (Colwell et al., 2008).

The Orff process refers to the series of steps through which the teacher/therapist guides the student/client to reach the short or long-term goal (Shamrock, 1986). This often includes the gradual layering of musical lines to increase complexity. The process may be developed from a small germ of an idea or by taking a larger idea and breaking it down into manageable steps (Scott, 2010). In a true Orff pedagogical ideal, the teacher/therapist strives to be a facilitator of the process rather than a director (Shamrock, 1986).

While Orff media and the Orff process were originally intended for music education, they can be adapted for music therapy. Specific to this study, the interventions could be expanded by facilitating a therapeutic process to teach the relaxation interventions. For example, the cued breathing intervention may begin with body percussion movement to teach the participant the 3/4 pattern of inspiration/expiration. Incorporating other Orff media, an improvisational movement section—which would continue to follow the bordun for breathing—could be introduced after

the breathing pattern and tempo is established. For the improvisational intervention, a participant-specific imagery chant could be created and then used as part of an “A B A” form where the participant could improvise on the glockenspiel during the “A” sections and chant during the “B” section. As rhythm is the foundation of the Orff Schulwerk approach (Colwell et al., 2008; Shamrock, 1986) and a steady beat is effective at reducing anxiety (Gadberry, 2011; Pelletier, 2004; Robb, 2000; Robb et al., 1995), it is recommended some form of bordun or ostinato—following the musical considerations cited earlier by Robb et al. (1995)—is continued to be played during potential extensions of these interventions.

A recommendation for the measures of future studies is to also collect and examine physiological data to provide an objective report on changes in physiological systems that have been associated with anxiety. These may include galvanic skin conductance, heart rate, and respiration rate. It would be interesting to see if two of the musical elements in this study (i.e., tempo and time signature), which were designed relative to the ratio of inspiration/expiration and to a low end resting respiration rate and heart rate, actually had an effect on those physiological systems. Other objective measurements that are associated with psychological and/or physiological arousal to be considered in future studies may include the chemical levels of oxygen saturation, partial pressure of oxygen, oxytocin, and cortisol. Each of these chemicals has been reported to alter with music stimulation, as discussed earlier in this paper (McKinney et al., 1997; Nilsson, 2009a, 2009b; Özer et al., 2013).

Finally, the author recommends expanding this study to a more diverse population by transferring these protocols to participant venues outside of music therapy and music performance anxiety. The researcher is particularly interested in using these interventions in a medical setting during preoperative care, as health-related anxiety is of major concern for

patients and medical staff alike. Other potential venues include areas where state anxiety is prevalent including academic testing, athletic competition, and public speaking. Lastly, the researcher is interested in using these protocols to target trait anxiety in individuals, as well as measuring both trait anxiety and state anxiety to determine whether higher prevalence of trait anxiety affects the magnitude of change in state anxiety.

In summary, the present study shows the benefits of two Orff-based music interventions to decrease state anxiety. Future research on the effects of Orff-based music interventions addressing state anxiety are warranted based on the results of this study. Both a passive (cued breathing) and an active (improvisation) intervention resulted in significantly lower state anxiety scores. The implications of Orff-based active music engagement or paced breathing on decreasing anxiety include a brief, simple, accessible, and cost-effective means to self-regulation for many who suffer from anxiety.

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