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Running as a Treatment for Music Performance Anxiety

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RUNNING AS A TREATMENT FOR MUSIC PERFORMANCE ANXIETY

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Running as a Treatment for
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The purpose of this paper is to examine perceived levels of music performance anxiety (MPA) when participants are prescribed a running treatment. Three research questions were investigated throughout this study: 1) How does a running program influence perceived levels of MPA among music performers? 2) What other outcomes do students report they experience from the running treatment? 3) Does increased cardiovascular health result in lower levels of perceived MPA? A secondary research question was asked: Do perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

Nineteen participants were recruited for this study from the Frost School of Music and were in varying areas of study at the undergraduate, masters and the doctoral level. The 19 participants were divided into two groups, control or treatment. The control group did a breathing exercise prior to a performance while the treatment group followed a six-week running plan. Statistical results from this research were not significant, but participants in the running group did report higher levels of confidence, decreased stress and anxiety, and increased lung capacity. Participants in both groups had a similar decrease in anxiety levels after treatment, breathing exercise or running. Implications from these results and suggestions for further research are offered.

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Chapter 1

Introduction

The symptoms of panic are similar to those experienced by a performer when walking onto a stage stage. Symptoms include sweaty palms, dry mouth, a nervous stomach and accelerated heart rate. Additionally, some performers may experience shaking hands or a trembling voice. This condition manifests its self differently according to the nature of the stress and for the musician is called Music Performance Anxiety (MPA), a type of situational social anxiety disorder.

Music Performance Anxiety (MPA) is a limitation that many musicians face throughout their career (Biasutti & Concina, 2014). It is caused by the irrational fear of being judged that may result in extreme consequences such as career loss and humiliation. This fear produces detremental symptoms during music performance, even though the performer is aware that it is irrational and unwarranted (Biasutti & Concina, 2014). The irrational fears that create anxiety are caused by the high levels of stress that are put on student and professional musicians. Career musicians can have stress from lack of job security, social pressures, reputation, and low income (Steptoe, 1989).

MPA creates both physiological and psychological symptoms. Physiological symptoms include sweaty palms, increased heart rate, upset stomach, and shortness of breath. Psychological symptoms include irrational fears and stress that can translate into physiological symptoms (Biatista & Concina, 2014). According to Khalsa, Butzer, Shorter, Reinhardt, and Cope (2013), stress and tension can also increase the likelihood of a performer suffering from an injury.

The attitude towards MPA varies from performer to performer. Two common and contrasting feelings performers have towards MPA are that a) the anxiety provides an edge to produce a higher level of performance and, b) the stress stifles performance quality (Biatista & Concina, 2014). Some adults with MPA report that it is a part of every performance. These individuals also report feeling physiological and psychological symptoms before the concert begins (Kenny, 2011). According to the Yerkes-Dodson model, the relationship between the degree of symptoms caused by MPA and performance level is curvilinear. The highest and lowest levels of symptom arousal can result in a lower level of performance; while medium levels of symptom arousal can result in a higher-level performance (Hoffman, Hanrahan, & Martin, 2012).

Debilitating symptoms of MPA are often associated with young, inexperienced performers, but professional musicians in various musical genres commonly experience symptoms of MPA that can end a career in music performance. Kenny (2011) reports that musicians interviewed reported their first memory of MPA during adolescent years. It has also been shown that children experience some level of anxiety before a musical performance, but it does not create the same level of psychological and physiological symptoms. The adolescent is much more focused on the irrational fears than younger children, increasing the likelihood of experiencing the symptoms associated with MPA.

Kenny (2011) presented multiple factors that can produce higher levels of MPA. Unfortunately, these factors are also a common component of a career in music. Sight-reading is a large part of being a performing musician of any genre, but fear of making mistakes during this task can bring about increased levels of nervousness. Playing from memory can also increase the stress experienced by a musician. When a performer enters

a soloist competition they are typically expected to play the piece from memory, creating a higher level of anxiety in an already stressful situation. Worry in the days and weeks leading up to a performance can also cause increased anxiety and physiological symptoms.

Some musicians seek treatment of MPA through the use of substances and meditative activities. In a survey of the members of the London Philharmonic Orchestra and Royal Philharmonic Orchestra, 22% of the members used alcohol and 12% used sedative drugs such as beta-blockers to combat performance anxiety (Biasutti & Concina, 2014). Beta-blockers relieve the physical symptoms that occur with MPA, even though the mental tension and pressures that occur with public performance are still present. A higher percentage of members used deep breathing, muscle relaxation, and distraction to reduce MPA (Biasutti & Concina, 2014).

Need for the Study

There are some coping methods that engender improvements in MPA without the use of drugs. Two of these methods are the Alexander Technique and Yoga. These two coping methods focus on breathing and posture to decrease levels of music performance anxiety. These two treatments also have a positive impact on injury due to the reduction of tension and stress in the body. An experiment was conducted on the benefits of practicing yoga as a treatment for MPA among adolescents at the Boston University Tanglewood Institute (Khalsa et al., 2013). The objective of this experiment was to adapt a previous study on yoga's effect on MPA and performance-related musculoskeletal disorders with adults and apply it to adolescents. Khalsa et al. (2013) found a significant

difference in MPA among those who received the treatment compared to the control group.

Cognitive Behavioral Therapy is the coping method most commonly used to treat state anxiety and is the only evidence-based treatment for anxiety. Steptoe (1989) used Cognitive Behavioral Therapy as a treatment in a study on MPA. Participants were shown a video of themselves performing and asked to discuss the internal dialogue that occurs during performance. The performer is then challenged to take any negative thoughts occurring in the internal dialogue and make them positive. The treatment group in this study improved significantly (Steptoe, 1989).

Muller and Armstrong (1975) suggest that running can be used as a treatment for people suffering from symptoms of anxiety caused by fear. Running creates nervous system responses that are very similar to the responses created by anxiety. Some of these symptoms include sweating, increased respiration, and accelerated heart rate. In a case study, they describe a patient with elevator phobia whose symptoms were dramatically reduced through a "running treatment" (Muller & Armstrong, 1975). Otto & Smits (2011) examined the use of cardiovascular exercise as an alternate treatment for clinical depression in place of prescription drugs such as Zoloft or Paxil. Participants in the exercise group experienced similar results to those who were provided the pharmacological intervention. Another study by Cambridge University shows that running can increase neurogenesis, the creation of new brain cells. Running also decreases the amount of cortisol, a stress hormone that is produced in the brain (Creer, Saksida, Van Praag, & Bussey, 2010).

Students and professional musicians are under an increased amount of stress, therefore it is important to focus on the mental well-being of students and professional musicians. Exploring other methods for coping with MPA, such as running, could assist in creating healthier performers. Private lesson instructors are often expected to have knowledge on the topic of MPA to allow them to share with students effective coping methods. Kenny (2011) interviewed professional musicians about experiences with private instructors when searching for answers for coping with MPA. One responder reported that his teacher would tell him he looked stressed before a performance and needed to smile. Another teacher focused on the music and suggesting the rehearsal of more complex sections at a level of near perfection before performance in order to build confidence and calm nerves. It is important to continue exploring other methods for coping with MPA so that music educators and private lesson instructors can more effectively assist students as they deal with potentially debilitating symptoms of MPA.

Yoga and Alexander Technique have shown positive results as treatment for MPA, but running, which has been used as a treatment for anxiety and depression, has yet to be used in any studies on MPA at this point. Due to the similarities between the nervous system's response during running and MPA, it is possible that those who run could feel more in control of MPA symptoms. It is possible to adapt the method used from Khalsa et al. (2013) yoga study and the findings from Armstrong and Muller's (1975) study on running to rationalize the need for a study on running as a method for coping with MPA. It may be possible to mimic the physical symptoms of MPA without the automatic negative thoughts, similar to Cognitive Behavioral Therapy, through a

running treatment. Those who receive the treatment may also experience decreased levels of stress.

Purpose

The purpose of this study was to examine perceived MPA when a running treatment is prescribed to music students in varying degrees who attend the Frost School of Music.

Research Questions

1. How are perceived levels of MPA among music performers influenced by a running program?
2. What other outcomes do students report they experience from the running treatment?
3. Does increased cardiovascular health result in lower levels of perceived MPA?

Secondary Research Question: Do perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

Definitions

Music Performance Anxiety will be measured using an adaptation of the Kenney MPA-I. This inventory aims to gather participants perceived MPA before and after treatment has been completed.

MapMyRun is the running application used by all participants to collect data. This will show when and how much each participant runs during the study. The researcher will have access to this application through the website mapmyrun.com. Participants are required to create an account only to be used for this study.

Cardiovascular Improvements are measured in the treatment group by a six-minute walk test given before and after treatment. The six-minute walk test measure how far a participant can walk in six minutes. An increase in distance also means increase in cardiovascular health.

Delimitations

Recruitment methods for this study include the researcher attending studio classes and speaking with Frost School of Music students about the study. Those who showed interest provided their name and email address to the researcher. After receiving approval, those students were contacted to provide the documents needed to participate in the study.

Only twenty participants were recruited for the study. Recruitment was limited to the Frost School of Music and only in classrooms and studios in which the principal investigator had the opportunity to recruit. The demanding schedule of many students at the Frost School of Music did not allow them to participate in this study.

Chapter 2

Literature Review

This chapter summarizes current literature on causes and predictors of MPA, treatments for MPA, running as a treatment for mental health issues, and implications for music educators. It concludes with a summary that makes connections between each area of the literature implying reason for running as a treatment for MPA.

Causes and Predictors of MPA

Biasutti and Concina (2014) used two standardized questionnaires, Performance Anxiety Inventory and Coping Orientation to Problems Experienced-New Italian Version, to measure participant's MPA, coping strategies, and provide the most valued factors in predicting MPA. The 171 participants used in this study were split into the following groups: advanced student and professional musicians.The advanced student group included 97 Northeastern Italian Conservatory students with their principal instrument as their main area of study. These students ranged in age from 14 to 26 with a mean age of 18.9; 54 of these students were female and 43 male. Amount of practice time per week ranged from 1.5 to 48 hours with a mean of 14.23 hours per student (Biasutti & Concina, 2014).

The professional musician group included 74 professional musicians. Musicians in this group were used for this study if they worked as a professional musician five years after earning a degree. Of these musicians, 25 were full-time orchestra employees while the other 49 were active performers in multiple ensembles and taught privately or in schools. In this group there were 24 females, 49 males, and one participant that did not specify. Ages ranged from 27 to 68 with a mean range of approximately 42. The

professional musician group spent between one and 40 hours practicing per week with a mean practice time of 13.6. Biasutti and Concina (2014) found there was a significant link between MPA and coping strategies in each group. Some reported MPA was debilitating to performance, while others believed it gave the edge needed for high level performance.

Steptoe (1989) examined the stressors that career musicians and students cope with in London. Participants included 65 members of the London Philharmonic Orchestra and Royal Philharmonic Orchestra and 41 music students from the Guildhall School of Music and Drama (Steptoe, 1989). Each group was given a questionnaire that listed stressors that a career musician may face. Professional musicians were asked to affirm stressors that they feel are particularly debilitating while students were asked to choose what they believe will be stressful about being a career musician (Steptoe, 1989). This study found that students were much more concerned with stresses in the social aspects of being a career musician, such as competition with friends and backstabbing, but showed little worry about traveling, inconsistent work hours, long rehearsals and separation from family (Steptoe, 1989).

The State Trait Anxiety Inventory was used with the career musician group to find if MPA and rating of stress as a professional musician were related (Steptoe, 1989). The professional musicians were divided into three groups using level of anxiety: high anxiety (21), medium anxiety (23), and low anxiety (21). Those considered high anxiety were much more affected by stress caused from uncertainty about regular employment, social issues such as competition, colleague backstabbing and the pressure to be social, and poor financial awards (Steptoe, 1989).

Treatments for Music Performance Anxiety

Treatments for MPA include prescription drugs such as beta-blockers, Alexander Technique, Yoga, and Cognitive Behavioral Therapy. It is important to diminish the stresses from MPA due to the link between anxiety and other serious health problems such as heart disease, respiratory disease, diabetes, self-medicating and psychological or psychiatric issues.

Yoga

Khalsa, Butzer, Shorter, Reinhardt, and Cope (2013) conducted an experiment on the benefits of yoga on MPA among adolescents attending the Boston University Tanglewood Institute. The objective of this experiment was to adapt a previous study on yoga's effect on MPA and performance-related musculoskeletal disorders with adults and apply it to adolescents. Preliminary studies on this topic found significant results.

Participants in this study were adolescent musicians who attend the Boston University Tanglewood Institute summer camp. These students were approximately 16 years of age and play various instruments. The Tanglewood Institute would not allow the researcher to deny any students the treatment, so those who received the treatment were volunteers. Those who did not volunteer were asked to participate as the control group. The control group only filled out questionnaires. Since the treatment group was made of volunteers, significantly more girls than boys received the treatment. The treatment lasted six weeks. Eighty-four participants received the treatment; 30 male and 54 female. Fifty-one students make up the control group; 29 male and 22 female (Khalsa et al., 2013).

Self-report questionnaires were used to determine the outcome measures. These questionnaires were titled Performance Anxiety Questionnaire, Music Performance

Anxiety Inventory for Adolescents, State-Trait Anxiety Inventory, Performance-related Musculoskeletal Disorders Questionnaire, and Evaluation of the Yoga Program. The Performance Anxiety Questionnaire is made up of sixty questions asking the participant to rate the level of performance anxiety symptoms in areas of practice, group performance, and solo performance. The Music Performance Anxiety Inventory for Adolescents asked the participants to rate specific and relatable questions on a seven-point scale. The State-Trait Anxiety Inventory asked participants to rate forty questions dealing with temporary and long-term feelings of anxiety. The Performance-related Musculoskeletal Disorders Questionnaire asked participants to rate the frequency, intensity, and duration of discomfort or pain. This particular questionnaire had been previously developed and proved to have high reliability. The Evaluation of the Yoga Program asked participants to rate their level of enjoyment of the yoga class and if he or she has an intention of continuing the practice (Khalsa et al., 2013).

The time frame for studies prior to this was eight weeks and worked with adults rather than adolescents. The eight-week yoga course was shortened to six weeks and only English was used during the practice rather than using Sanskrit names. Popular music, yoga games, and partner yoga were also added into this curriculum to make it more appealing to the adolescent participants. Kripalu, the style of yoga used for this study, incorporates typical yoga postures, breathing techniques, and meditation. It is notable that the instructor for this study is also a trained classical musician (Khalsa et al., 2013).

The questionnaires were analyzed after the treatment was completed using twelve multiple regressions on subscales of the four outcome variables. These outcome variables are Performance Anxiety Questionnaire, Music Performance Anxiety Inventory for

Adolescents, State-Trait Anxiety Inventory, and Performance-related Musculoskeletal Disorders Questionnaire (Khalsa et al., 2013).

The study found significant difference in Music Performance Anxiety among those who received the treatment compared to those who did not. There were no significant findings for change in Musculoskeletal Disorders, but this may be because of the shortened treatment from the planned eight weeks to six weeks (Khalsa et al., 2013).

Other studies have shown that a yoga lifestyle intervention can decrease overall anxiety and other issues stemming from anxiety. All of the studies reviewed on yoga show a consistency of practice in the treatment group in order to get results. Results found by Yadav, Magan, Mehta, Mehta, and Mahapatra (2012) showed both significant results in the reduction of anxiety and of overall health issues among the treatment group. This suggests that the reduction of anxiety can result in overall health benefits among a treatment group.

Alexander Technique

Alexander technique was developed by and actor named Frederick Matthias Alexander. Alexander noticed at the height of his career that he was developing vocal issues while acting. Sometimes he would not be able to talk by the end of a performance. Several doctors told him he was fine and that there was no issue with his vocal chords. He was very frustrated with this and was determined to find the cause of his loss of voice (Kleinman & Buckoke, 2013).

Alexander started looking at himself in the mirror at home while practicing acting. He realized when he would speak his body was very tense. This tension started from tightly gripped toes and gradually worked its way up to the top of the body. He

attempted to fix his issues in front of a mirror but realized what he thought his body was doing was not always what it was actually doing. He had to retrain his body completely (Kleinman & Buckoke, 2013).

Alexander also realized many problems came from habit. He was used to feeling tension and tightening muscles in his body when he entered the stage. This is similar to when a musician practices a passage incorrectly; once the habit is established it can take twice as long to break the habit than it did to establish it in the first place. Alexander refers to the breaking of habit and creating a new one as inhibition (Kleinman & Buckoke, 2013).

Another key component of rejecting an old habit is direction. Direction is the approach to realigning the body without forcing it. An example of this would be visualizing the head and neck extending forward and up rather than forcing the head and neck to physically move right away. Inhibition and Direction together create a patient approach that allows the body to realign in its own time. The patience developed in this technique is also a great tool for musicians who are often rushed to be perfect as quickly as possible sometimes to the point of injury or mental harm (Kleinman & Buckoke, 2013).

Valentine, Fitzgerald, Gorton, Hudson and Symonds (1995) conducted a study looking at the effect Alexander technique lessons has on music performance in high and low stress situations. Participants included 25 music performance students at a university in the United Kingdom. Sixteen of the students were majoring in music performance while the other nine were in the advanced music performance program. Twenty-one participants were female and four were male. Participants included six singers, five

violinists, two cellists, three pianists, two organists, three flautists, one oboist, two clarinetists, and one trombonist. For the majority of the components of this study only 21 of the subjects were considered due to the loss of four musicians during the time of the study.

These musicians were randomly assigned to a treatment group or non-treatment groups. The treatment group received a course with fifteen lessons in Alexander Technique. Measurements of MPA were taken during the audition process, in class before the treatment began, in class after the treatment, and at the recital at the conclusion of this study. The four situations are measured with the performer in high stress and low stress situations. The audition and final performance are high stress situations because the students were being graded. The in-class situations were considered low stress because the participants would not suffer any serious consequence for mistakes (Valentine et al., 1995).

This study used several forms of measurement to find the effect of Alexander Technique on MPA. These tests included the Eysenck Personality Inventory, Performance Anxiety Inventory, level of interest in Alexander Technique measured by a four-point scale, Peak Flow Meter, mood measurement and heart rate prior to performance, Full Nowlis mood checklist, and Music Performance Anxiety Self-Statement immediately following performance. Students were also videotaped without sound and judged on use or misuse of Alexander Technique while performing. Results were significant in several areas. Participants in the experimental group had less accelerated heart rate than those participants who were not treated. Significant difference

was not found in high stress performance situations such as the final concert. Performers did show significant difference in class, or during low stress situations.

Technique was improved and overall mood of the participants in the treatment group was also improved. Participants gave positive feedback and reported that Alexander Technique made a difference for them. Several stated they would like to continue the lessons if possible.

This study is one of the only studies on Alexander Technique that is specific to MPA. Most studies focus on posture and injury prevention. These aspects that Alexander Technique focuses on can also have an effect on MPA as stated previously. Vocalists and theatrical performers most commonly use Alexander Technique, but it is beneficial to all musicians (Valentine et al., 1995).

Cognitive Behavioral Therapy

Cognitive Behavioral Therapy is used to change the thought process of someone suffering from anxiety and other disorders. This works by changing the internal dialogue from negative to positive. It is the only treatment that is considered an evidence-based treatment for anxiety and was used as a coping method in a study on MPA (Steptoe, 1989).

In a survey of professional musicians Steptoe (1989) found that MPA was most commonly associated with worry about tension in musicians with state anxiety. Musicians who had a medium level of anxiety were the most likely to have rational thoughts about the performance process. Performers whose MPA increased several days prior to a big concert were more likely to have more irrational thoughts about the

outcomes of a performance. These musicians also listed on the questionnaire that a bad performance could result in complete failure of becoming a performer.

In a study reviewed by Steptoe (1989) musicians were asked to watch themselves in a videotaped performance and speak aloud about what was going through his or her head during the performance. Musicians were then challenged to take the negative dialogue that was happening in their head and turn it into positive statements. The musicians were encouraged to do the same thing at home and practice positive dialogue while practicing. This study found that even though the treatment time was extremely short, the group of musicians who were receiving the intervention had a greater decrease in MPA than the group that did not receive treatment.

Beta-Blockers and Other Drugs

Some musicians seek help for MPA through the use of substances. In a survey of the members of the London Philharmonic Orchestra and Royal Philharmonic Orchestra, 22% of members used alcohol and 12% used sedative drugs such as beta-blockers to combat performance anxiety (Biasutti & Concina, 2014). Beta-blockers relieve the symptoms that occur with MPA, but the musician still feels the tension and pressures that occur with public performance. (Biasutti & Concina, 2014).

Beta-blockers were first created in the early 1970's to treat heart conditions. It was discovered soon after their initial trial that they could also be useful in reducing stress and tension in the muscles caused from stress. Several studies have shown that 20-30% of musicians use beta-blockers in order to effectively do their job (Patson & Loughlan, 2014).

Despite the positive effects of beta-blockers on the manifestations of physical symptoms among performers, there are many side effects that may create symptoms more severe than MPA. Beta-blockers initially work by slowing down the heart, but if the heart rate is not too accelerated to begin with, it is possible the heart rate will slow too much. This can cause many issues for the performer such as light-headedness and confusion. Beta-blockers can also have a negative effect on the cardio-vascular system, the central nervous system, gastrointestinal, and the respiratory system (Patson & Loughlan, 2014).

Running as a Treatment

Many studies have been conducted on the release of endorphins while running and the effect this can have on the brain (Fede, 1986). Some theories have linked running with transcendental meditation, which is theorized to bring about an altered state of consciousness. It creates an equal or greater change in the brain as relaxation techniques such as meditation and breathing exercises (Fede, 1986).

Fede (1986) used peer-reviewed literature on the topic of running and mental parameters, high brain laterality, exercise addiction, psychotherapy and endorphins to analyze and make implications for the use of running in everyday life.

Fede (1986) found that beta-endorphins, catecholamine, norepinephrine, epinephrine, and dopamine rose in all subjects who exercised. Endorphins released during running can have an effect on psychological functions of the body as well as physiological (Fede, 1986). A study using EEG changes in runners were examined finding alpha activity increased during running and showed even greater increases after running in the right hemisphere of the brain allowing runners to think more clearly post-run (Fede, 1986).

Fede (1986) also found that running could be used as an antidepressant due to a change mechanism in the brain that is caused by oxygenation and blood flow. Norepinephrine is shown to be low in depressed people and is released during running.

Motta, McWilliams, Schwarts, and Cavera (2012) examined literature on the role of exercise in reducing childhood and adolescent PTSD, Anxiety, and Depression. Most of the literature on this topic only deals with adult participants. The research that has been conducted with child and adolescent participants so far has shown similar results supporting the hypothesis that exercise can decrease PTSD, anxiety and depression.

The focus on this study is exercise's role in decreased anxiety among both adults and children. Participation in exercise, such as running, can increase feelings of independence and self-confidence because of accomplishment and ability to set and meet goals (Motta et al., 2012). The decrease in anxiety and depression could also occur because of the release of endorphins, which improve mood and brain function. There are few studies completed that compare exercise to other forms of therapy for adolescents or children dealing with anxiety.

Both articles used in the topic of running's effect on the brain were extensive literature reviews that combined previous studies to infer results. This shows that there is a need for more research on the topic of running in relation to anxiety and, for the purposes of this study, running's effect on MPA.

Muller and Armstrong (1975) discussed the "running treatment" for phobias and anxiety. The running treatment was used to create a sense of control over symptoms from increased levels of anxiety. Running creates physiological symptoms that are very similar to that of anxiety such as increased perspiration, racing heart, and shortness of breath.

Muller and Armstrong (1975) prescribed the running treatment to a woman who had been complaining of severe elevator phobia. The client would jog from the clinic to a nearby department store. By the time she arrived, fatigue had set in. She was out of breath, her heart was pounding and her legs were shaking, but she felt calm. She was able to ride the elevator. After the treatment was completed the client was taught the dangers of an elevator and how to escape in case she got stuck in one. She rated her improvement a nine on a scale of one to ten several months after the treatment.

This study could be applied to MPA, but it is important to note that this study included only one subject. There is more literature needed on the topic of running and its effects on anxiety.

Implications for Music Educators

Music Educators, both classroom and private, play a very important role in the development of healthy musicians. It is important for music teachers to discuss what it feels like to be nervous before a performance and how to deal with it. Sometimes teachers are much more focused on covering standards and preparing for the upcoming concert that they forget about the effect a performance can have on students (Patson & Loughlan, 2014).

Private teachers are more likely to talk about these issues with students. It is also important for classroom music educators to talk to students about these issues because there are increasingly more performances and pressures on students in public schools to perform at a high level (Patson & Loughlan, 2014)

Conclusions

It is no doubt that there are many physical benefits when leading a healthy and active lifestyle, but there are also many benefits for mental health. Recent research has shown that exercise, running in particular, can be used as an antidepressant, mood improver and alleviate anxiety. This is all possible because of neurotransmitters, specifically serotonin, in the brain that affects levels of mood, depression and anxiety (Otto & Smits, 2011). Antidepressants such as Paxil and Zoloft regulate levels of neurotransmitters (Otto & Smits, 2011). Exercise, such as running, has the ability to produce the same results by increasing levels of neurotransmitters like serotonin (Otto & Smits, 2011).

A study of 202 adults that were diagnosed with clinical depression underwent a four-month experiment to determine if exercise was an equivalent prescription to drugs such as Zoloft or Paxil (Otto & Smits, 2011). Those participating in this study were assigned to four different groups as random. These groups included home based exercise, supervised group exercise, treatment with an antidepressant, and treatment with a sugar pill. People in the exercise and medication group tended to experience the same results, while those on the placebo experienced little results. Forty-five percent of people in the group exercise class were no longer in the criteria for clinical depression as well as 40 percent of those in the home exercise group. This is comparable to the 47 percent of people who took the prescription drug.

As shown in this study, one can assume that people who exercise are less likely to need prescription drugs for issues such as depression or anxiety. It is also important to note that the supervised group-exercise class had a higher rate of people who were no

longer considered clinically depressed after this study. This may have implications that it is more important to have a community around you while exercising to ensure you are held accountable.

Exercise may also have the ability to affect mood, depression and anxiety because of the feelings associated with it. When you run or bike your heart rate is increased, you get sweaty, and your breathing becomes heavy. The difference between this and feelings of anxiety are very little, but in the case of exercise it is controlled and wanted. It is possible after understanding how this feels in a controlled environment; it can be better controlled during an anxiety attack. This was true for a 29 year old male who was seeking treatment for a panic disorder (Otto & Smits, 2011). Rather than prescribing medicine, he was prescribed exercise and found it to be very beneficial when he experienced feelings of panic a few months into the exercise trial.

The current literature on MPA shows there is a need for more studies on treatments for MPA without the use of prescriptions and other drugs. Current research shows that Yoga, Alexander Technique, and Cognitive Behavior Therapy reduce levels of MPA. There is a need for more studies on MPA that use various types of exercise as a treatment. This will avoid the use of prescription drugs and self-medicating while also creating a path for musicians to create healthier lives both psychologically and physiologically. Running has been used as a treatment for other mental illnesses such as anxiety, depression and overall stress relief. Because it has not yet been used as a treatment for MPA, there is a need for this study.

Chapter 3

Method

The purpose of this study was to examine the impact of a running intervention on perceived MPA in music students who attend the Frost School of Music. Research questions that were addressed included: 1) How are perceived levels of MPA among music performers influenced by a running program? 2) What other outcomes do students report following the running treatment? 3) Does increased cardiovascular fitness result in lower levels of perceived MPA? A secondary research question addressed was: Do perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

This chapter describes the method used to complete the study and is organized by Participants, Measures and Instrumentation, Description of Treatment, Data Collection Procedures and Data Analysis Procedures.

Participants

Prior to the initiation of this study, studio classes and instrumental music forums were surveyed to appraise intrest in the study. Participants for this study were recruited and contacted about this study after receiving IRB approval on December 9, 2016. Those who were interested provided a name and e-mail address for future contact about the study. Forty-eight names were initially collected. Twenty decided to participate in the study, but only nineteen met the criteria to participate. The following are criteria for: 1) Participants must be recent or current students at the Frost School of Music. 2) Participants must be instrumentalists. 3) Participants must not currently run more than five miles per week, but it is preferred that participants do not run at all.

The 20 participants completed four forms before being randomly placed in the running group or control group. The first form was a consent document created and approved during the IRB process. This document detailed all risks and requirements of those who chose to participate in the study. The second document, Physical Activity Readiness Questionnaire (PAR-Q), was used to determine if participants were healthy enough to run. Those who were not healthy enough to run were not allowed to participate in this study. The third document was an adaptation of the Kenny MPA-I (2009). The final form was created by the research team and used to determine participant background information. Information from this form is what I will be focusing on in this section.

It was determined after vetting paperwork that all but one participant met the criteria for the study. One person did not pass the PAR-Q and was not eligible to participate in this study. All other participants were randomized between the two groups with nine in the control group and ten in the treatment group.

The running group included ten participants ranging in age from 19 to 40 years old with a mean age of 25.4, a median age of 23.5, and a mode age of 22 and 23. Six of the participants are male and four are female. Four are pursuing a master's degree in Instrumental Music Performance, two are pursuing an artist diploma in Instrumental Music Performance, two are pursuing a master's degree in Studio Jazz Performance, one is pursuing a bachelor's degree in Instrumental Music Performance, and one is pursuing a master's degree in Music Education with certification. Six of the participants play brass instruments and four play string instruments. The number of hours per week this group works out prior to the running treatment ranges from 0 to 6 hours with a mean of 3.1

hours. Prior workout activities include weight lifting, racquetball, stationary bike, walking, jogging, yoga, and cross fit.

The control group included nine participants ranging in age from 22 to 29. The mean age of this group is also 25.3. The mode and median age is 25. Six of the participants in this group are male and three are female. Six participants are pursuing a master's degree in Instrumental Music Performance, one is pursuing a doctorate in Instrumental Music Performance, one is pursuing a master's degree in Studio Jazz Performance, and one is pursuing a PhD in Music Education. Seven of the participants play string instruments, one participant plays a brass instrument, and one plays percussion. The number of hours per week this group works out prior to this study ranges from 0-12 hours with a mean of 3.9 hours. Prior workout activities include weight lifting, cardio, walking, and swimming.

Measures and Instrumentation

Participants in this study filled out the Physical Activity Readiness Questionnaire (PAR-Q). The PAR-Q was used to determine if the participant is healthy enough to complete the running treatment. One participants did not pass the PAR-Q and was not allowed to participate in the study. All students placed in the running group also completed a six-minute walking test before starting the running treatment to measure cardiovascular health. The running group also completed the six-minute walking test at the end of the study to measure improvements in cardiovascular health.

Participants filled out a background inventory at the beginning of the study which provided the participant's age and gender. Instrumentalist information included the

participant's instrument, major, and degree level. Exercise information included the participant's estimated hours of exercise per week and the type of exercise.

Perceived levels of MPA were measured in the treatment group and control group before the study began using an adaptation of the Kenny MPA-I (2009). This inventory allows participants to rate MPA on a scale of one to five with one being "strongly agree" and five indicating "strongly disagree." This measure was given to the control and treatment group at the end of the study to measure changes in MPA. The treatment group answered two additional questions at the end of the inventory that allowed each participant to describe their personal experience with running and if they would continue to run after the treatment is completed.

Participants in the treatment group were required to download the free application MapMyRun to their phone to measure the six-minute walk test and the treatment. Participants used the e-mail provided to the principal investigator and created a password. If the participant already had the application, they were required to create a separate account for this study. Participants then e-mailed the researcher the password they chose so that I would have access to the account during the treatment. The use of the application ensured that the treatment was completed as specified in the instructions. Each participant account was viewed once a week to check on progress. If a participant seemed to be non-compliant, he or she would be sent an email. The data provided by the MapMyRun application includes date and time of run, location, pace, calories burned, overall time, overall distance, and elevation gain. Participants also had the option of making notes in each run or rating how they felt during the run. The application also allowed for participants to run on the treadmill and still record data.

The amount of preparation time used for this study was approximately four months. This included completion of the IRB protocol, recruitment, collection and creation of inventories and running technique video, creation of the method, and proposal defense. The treatment takes approximately seven weeks. The treatment lasted six weeks, and then participants completed a final MPA inventory and a six-minute walk test. Overall the study took six months.

Description of Treatment

The participants placed in the running treatment group were provided with a running calendar. This calendar includes three thirty-minute run/walks each week for six weeks. The calendar is flexible so that participants could place the runs on any day of the week that is convenient. Participants much log three runs as completed each week in the MapMyRun application. The calendar increases amount of time running each week. Eventually participants will run for 30 minutes straight. These runs were tracked using the MapMyRun application.

Figure one shows the adjustable running treatment calendar participants will be following. This running calendar was creating using two different sources and then approved by University of Miami professor of Kinesiology and Exercise Physiology, Dr. Joseph Signorile. The two sources for this calendar are *The Everyday Running Book* (2008) and the Six-Week Beginner 5k Schedule from Runner's World Magazine (2016).

Participant Treatment Schedule

W=Walk, R= Run, Number=Minutes

Week	Day 1	Day 2	Day 3
1	W 5 R 2, W 3 R 2, W 2 R 2, W 3 R 2, W 9	W 5 R 3, W 3 R 3, W 3 R 3, W 10	W 5 R 3, W 2 R 3, W 2 R 3, W 2 R 3, W 5
2	W 5 R 5, W 3 R 4, W 3 R 3, W 7	W 5 R 6, W 3 R 6, W 3	W 5 R 5, W 2 R 6, W 2 R 5, W 2 R 5, W 7
3	W 5 R 12 W 3	W 3 R 15 W 3	W 3 R 10, W 3 R 7, W 2
4	W 3 R 10, W 4 R 5, W 2	W 3 R 20 W 2	W 3 R 2, W 2 R 10, W 5
5	W 5 R 10, W 3 R 10, W 2	W 5 R 25	W 3 R 2, W 2 R 10, W 5
6	W 5 R 30	R 20	W 5 R 30

Figure 1. Weekly Participant Treatment Schedule.

Participants in the control group were required to complete the following breathing exercise before a performance:

> "Close off the left nostril with your thumb, breath in. Then hold down right nostril with the index finger of the same hand and breathe out. Repeat for five minutes. Inhale through both nostrils for four counts and out for four counts, repeat for five, six, seven, and eight counts."

Data Collection Procedures

All participants filled out the adaptation of Kenny MPA-I (2009), background information before and after treatment, and the PAR-Q and consent form prior to the study through e-mail. Participants in the treatment group also completed a six-minute walk test using the MapMyRun application before and after the treatment.

The adaptation of the Kenny MPA-I (2009) was used to measure changes in perceived MPA between the treatment and control group after treatment. According to Osborne and Kenny (2005) this inventory has internal reliability (Cronbach's $\alpha = .94$). This test is frequently used for adolescents and measures emotion-based anxiety. The original test used a seven number scale, but for purposes of this project it was adapted to five. Some questions were also removed and three were added to better suit the university demographic.

The background information questionnaire was used to collect general information on participants that may impact the outcome of the study. This included gender, age, instrument, degree, major, time spent per week exercising prior to the study and if applicable what type of exercise.

The PAR-Q was used to determine if a participant was healthy enough to run. The form has seven yes or no questions that participants answer on their own. The participant must respond no to all questions to be considered for this study. If the participant was considered not healthy enough to run they were not allowed to participate in this study. This form is a standard procedure for people beginning an exercise program. The six-minute walk test was also used to determine if participants in the run group were healthy enough to run. The six-minute walk test was given to the treatment group again at the end of the study to measure cardiovascular improvements. This test measured how far each participant could walk in six-minutes. Distance and other data given for the six-minute walk test were collected using the MapMyRun application. Using this test, I will be able to compare cardiovascular improvements to improvements in MPA. Both the PAR-Q and the six-minute walking test were recommended by Dr. Joseph Signorile.

The MapMyRun application was also used to measure date and time, distance, pace, speed, elevation, and calories burned while participants completed the treatment. I accessed each account using the participant's email and password on the MapMyRun.com website. Some participants also used the application to leave notes about the run or rate runs as successful while completing the treatment.

The final MPA-I given to the treatment group had two extra questions. Those questions asked the participants to explain their experience with running and if they would continue to run after the study. This portion of the inventory was used to find what other outcomes participants experience during the running treatment.

Data Analysis Procedures

Research question one was answered using the MPA-I provided to the control and treatment group before and after the study. This questions asks how perceived levels of MPA among music performers are influenced by a running program. To determine this difference among groups I used an ANCOVA.

A content analysis was used for the open-ended responses that are given on the final MPA inventory for those in the running treatment group. This will answer question two: What other outcomes do students report following the running treatment?

I used a correlation to determine if improved perceived MPA relates to improved cardiovascular health. Cardiovascular health was measured at the beginning and end of the study by the six-minute walk test. If the participant was able to walk a greater distance after the treatment then cardiovascular health has improved. Distance walked during the six-minute walk test was measured using the MapMyRun application. This will answer question three: Does increased cardiovascular health result in lower levels of perceived MPA?

A correlation was used to answer the secondary research question: Do perceived levels of MPA vary among participants based on degree concentration, instrument, gender, and age? The demographic information for this question was gathered using the background information form collected from all participants before the start of the study.

Chapter 4

Results

The purpose of this study was to examine perceived MPA when a running treatment is prescribed to music students in varying degrees who attend the Frost School of Music.

The following are research questions I answered during this study:

1. How does a running program influence perceived levels of MPA among music performers?
2. What other outcomes do students report they experience from the running treatment?
3. Does increased cardiovascular health result in lower levels of perceived MPA?

Secondary Research Question: Do perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

This chapter aims to answer each research question through an analysis of data that has been collected during this study. This chapter is organized by research question as provided above. This chapter will conclude with a summary of findings from the study.

Research Question One

Research question one asks performers to gauge perceived levels of MPA before and after completing a running program. The 19 participants for this study were split into two groups, control or treatment. The control group completed a breathing exercise before a performance while the treatment group followed a six-week running program. Each group was given an adaptation of the Kenny MPA-I before and after the treatment.

In order to answer this question, I used an ANCOVA through statistical software SPSS to determine modified post-test group differences in MPA with treatment as the independent variable and the pre-test as the covariate. Results are presented in Table 1. No significant differences by treatment were found, although a significant pretest difference was found, Indicating the need for an ANCOVA procedure. Significant findings would be .05 or less in the significance column. It is important to note that both groups, control and treatment, had similar changes between the pre-test and post-test.

Table 1

ANCOVA Summary Table for Treatment on Post-test MPA Scores

Source	SS	df	MS	F	Sig.
Model	432.85	2	216.425	2.771	NS
Intercept	64264.47	1	67628.45	822.798	.000
Treatment	.058	1	.058	.001	NS
Pretest	432.792	1	432.792	5.541	.032
Error	1249.68	16	78.105		
Total	65917.00	19			

Note: Pretest is the Covariate

The control group had more anxiety than the treatment group before the study and showed a greater difference, 2.8 more, in the pre-test to post-test difference. For this inventory, the greater the number, the less anxiety the group or participant has. The mean of the pretest for the control group is 47.8 and the mean for the treatment group pre-test is 50.4. The mean for the post-test of the control group is 57.8 and the mean of the post-test for the treatment group is 57.6. The difference from pre-test to post-test for the control group is 10.0 while the difference for the treatment group is 7.2. The four participants who did not complete the treatment in the treatment group showed more perceived levels

of MPA present after the treatment than the majority of other participants.

Research Question Two

Research question two asked participants in the running group what other outcomes they have experienced from the running treatment that may not be measured on the perceived MPA-I. Participants answered the following two questions in their own words on the post-treatment MPA-I. 1) Do you plan to continue running after this study? 2) In your own words, how has the running treatment affected you musically or otherwise?

Only six participants (60%) fully completed the treatment. Seven of the participants said they would continue to run after the conclusion of this study, one who did not complete the treatment said they would complete the treatment, and two said they would not continue running. One of the participants who said they would not continue running explained that it was only because of time restraints. Participants struggled with time management throughout the course of this program. Because the majority of participants are graduate students, their schedules were already very packed before adding the running treatment. It is important to note that three of four participants who did not complete the treatment said they would continue running after the conclusion of the study. The other participant who did not complete the study would complete the treatment after the conclusion of the study.

There are several words that participants used in answering this question that occur in more than one participant response. The word confidence appeared in responses from participants four, six, and nine. Two of those three participants completed the full running treatment. Participants one and seven noted an increase in energy and mental

endurance. I have paired these two words because the context of each response shares the same meaning.

Seven of the ten participants noted a decrease in stress and anxiety through the use of words like comfortable, calm, de-stress, less anxiety, stress-levels, and releasing tension. Participants who used these words to describe their experience with the running treatment are participants one, three, four, five, seven, nine and ten. Of these participants, three did not complete the treatment, but still perceived the treatment to have decreased their MPA.

Participants seven and eight reported an increase in lung capacity and increased breathe support. Both of these participants are brass players and depend on breath support and lung capacity for a positive performance experience. Participant seven is a French horn performance major and participant eight is a jazz trumpet major. For future study, it would be interesting to ask wind players to gauge increases in lung capacity and breath support.

Participant two is the only participant who did not report an effect despite extra motivation to work out. This participant completed the least amount of the treatment. It is possible that this participant did not complete enough of the program. This participant did not complete the workouts that were completed as instructed, so placement of runs was more sporadic. In future research, it should be emphasized to participants that following directions for the treatment is crucial.

Research Question Three

Participants in the running treatment group were asked to complete a six-minute walking test before and after treatment to determine any increase in cardiovascular

health. The greater the distance measured in six minutes, the greater the cardiovascular capacity. Seven of ten runners made a slight improvement to their cardiovascular health and three had a decline in their scores from pre-test to post-test.

Participants who had a negative difference between the pre-treatment walking test and post-treatment walking test did not complete the treatment. The greatest amount of cardiovascular improvement was from participant five. Participant five was one of the only participants who completed the running treatment and followed the direction of spreading out runs three times a week. Participant five's consistency may have affected results in the six-minute walking test.

Research question three asks if increased cardiovascular health results in less MPA. A correlation was used to answer this question by comparing results from the six-minute walking tests to the adaptation of the Kenney MPA-I (See Table 2). No significant relationship was found.

Table 2
Correlations among Pretest, Post-test, and Cardio Scores

	Post-test	Cardio
Pretest	.51*	- .26
PostTest		.11

*p<.05

Secondary Research Question

The secondary research question examined participant demographic information to determine if there are any other relationships present. This question is: Does perceived

levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

The running group included ten participants ranging in age from 19 to 40 years old with a mean age of 25.4, a median age of 23.5, and a mode age of 22 and 23. Six of the participants are male and four are female. Four are pursuing a master's degree in instrumental music performance, two are pursuing an artist's diploma in Instrumental Music Performance, two are pursuing a master's degree in Studio Jazz Performance, one is pursuing a bachelor's degree in Instrumental Music Performance, and one is pursuing a master's degree in Music Education with certification. Six of the participants play brass instruments and four play string instruments.

The control group included nine participants ranging in age from 22 to 29. The mean age of this group is also 25.3. The mode and median age is 25. Six of participants in this group are male and three are female. Six participants are pursuing a master's degree in Instrumental Music Performance, one is pursuing a doctorate in Instrumental Music Performance, one is pursuing a master's degree in Studio Jazz Performance, and one is pursuing a PhD in Music Education. Seven of the participants play string instruments, one participant plays a brass instrument, and one plays percussion.

The next step to answering the secondary research question is to perform a correlation between these groups and the outcome of the MPA-I (See Table 3). No significant correlations were was found related to MPA expect for a correlation with pre-test MPA scores, while degree program correlated with increased cardio scores.

Table 3

Correlations among Cardio, Pre-test, Post-test, Gender, Age, and Degree

	Pretest	Post-Test	Gender	Age	Degree
Cardio	-.26	.11	.14	-.37	.69*
Pretest		.51*	.34	.32	-.01
Post-Test			.31	-.12	-.40
Gender				-.17	-.01
Age					-.15

*p<.05

Discussion

Research question one can be compared to Khalsa, et al (2008) study on using yoga as a treatment for MPA. The treatment for this study lasted six weeks and found significant results among participants in the two groups that received a yoga treatment. The yoga study used more inventories to measure improvements in MPA including a State-Trait Anxiety Inventory and a Performance Anxiety Inventory. Using more inventories in future research could paint a better picture of the results.

Khalsa, et al (2008) used a yoga program that began with breathing exercise similar to the one the control group used. The purpose of the breathing exercise is to calm the mind and the body. More participants in the control group reported decreased levels of MPA than those in the running group. Future research on running as a treatment for MPA should use a different control to accurately measure the affect of a running treatment. It would also be useful to do a study specifically on the effects of a breathing treatment on MPA.

Findings from research question two can be compared to Muller and Armstrong (1975). Muller and Armstrong prescribed a running treatment to a woman who had a

phobia of elevators. The increased heart rate due to running allowed her to have more control over her body and conquer anxiety associated with her phobia. Although, statistical results were not significant, most participants reported some change in physiological or psychological symptoms of MPA.

Research question three and the secondary research question can not be compared to research reviewed in the literature review because no prior study on MPA used a walking test or cardiovascular health as a measure and no other studies reviewed made correlations between demographic factors and MPA.

There are no significant results from this study. Participants in the running group did report decreased levels of anxiety, more confidence, and two brass players reported more air support in answers to question two. While no results were significant, there was still a slight decrease in MPA among most participants. The only correlation found in this study was between degree program and cardiovascular improvements. Further analysis of these questions, implications, and recommendations for further research can be found in the following chapter.

Chapter 5

Summary

The purpose of this study was to examine perceived music performance anxiety (MPA) when a running treatment is prescribed to music students who attend the Frost School of Music. Research questions that I answered during this study included the following: 1) How are perceived levels of MPA among music performers influenced by a running program? 2) What other outcomes do students report following the running treatment? 3) Does increased cardiovascular health result in lower levels of perceived MPA? As a secondary research question, I asked: Do perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age?

Participants for this study were recruited from the Frost School of Music after the study received Institutional Review Board (IRB) approval on December 9, 2016. Twenty students agreed to participate in the study and were randomly divided into the control group or treatment group after completing a background information form, consent form, initial music performance anxiety inventory (MPA-I), and physical activity readiness questionnaire (PAR-Q).

Recruitment for participants was limited by time restraints of the semester. It was also limited by the number of classrooms that were approved for a visit to speak about this study to students. I primarily spoke to Instrumental Performance majors in studio classes or forums. Students who were interested would place their name and e-mail address on a form to be contacted with more information later in the semester. Originally 45 names were collected, but only 20 agreed to participate in the study. One participant did not pass the PAR-Q and was not allowed to participate in this study, leaving the study

with only 19 participants. Participants were randomly divided into the control or treatment group.

The running group included ten participants ranging in age from 19 to 40 years old with a mean age of 25.4, a median age of 23.5, and a mode age of 22 and 23. Six of the participants are male and four are female. Four are pursuing a master's degree in Instrumental Music Performance, two are pursuing a post master's degree artist diploma in Instrumental Music Performance, two are pursuing a master's degree in Studio Jazz Performance, one is pursuing a bachelor's degree in Instrumental Music Performance, and one is pursuing a master's degree in Music Education with certification. Six of the participants play brass instruments and four play string instruments. The number of hours per week this group works out prior to the running treatment ranges from 0 to 6 hours with a mean of 3.1 hours. Prior workout activities include weight lifting, racquetball, stationary bike, walking, jogging, yoga, and cross fit.

The control group included nine participants ranging in age from 22 to 29. The mean age of this group is also 25.3. The mode and median age is 25. Six of participants in this group are male and three are female. Six participants are pursuing a master's degree in Instrumental Music Performance, one is pursuing a doctorate in Instrumental Music Performance, one is pursuing a master's degree in Studio Jazz Performance, and one is pursuing a PHD in Music Education. Seven of the participants play string instruments, one plays a brass instrument, and one plays percussion. The number of hours per week this group works out prior to this study ranges from 0-12 hours with a mean of 3.9 hours. Prior workout activities include weightlifting, cardio, walking, and swimming.

An adaptation of the Kenny MPA-I was used to measure participants pre-treatment and post-treatment perceived MPA for the control and running group. The running group was given two free response questions at the end of the second MPA-I for descriptive analysis. They were asked if they planned to continue running after the treatment and how the treatment affected them personally. Cardiovascular health was measured in the treatment group using a six-minute walk test before and after treatment. The six-minute walk test and all workouts were recorded using the MapMyRun application. This also allowed the researcher to check on participant progress.

The treatment group followed a six-week running program that gradually built up endurance through alternating running and walking. Each workout lasted approximately thirty minutes. The final workout was thirty minutes of running. Runners were instructed to run three times each week on days that their schedule allowed. Four of the ten runners did not follow this instruction during treatment.

Participants in the control group were required to complete the following breathing exercise before a performance of their choice. Close off the left nostril with your thumb, breath in. Then hold down right nostril with the index finger of the same hand and breathe out. Repeat for five minutes. Inhale through both nostrils for four counts and out for four counts, repeat for five, six, seven, and eight counts.

Data was collected using the adapted version of the Kenny MPA-I before and after treatment through email. All other data was collected using the MapMyRun application. The researcher had access to each account and checked on it weekly to follow up with participants about running progress.

Conclusions

Perceived levels of MPA among music performers influenced by a running program were examined by using the Kenny MPA-I. No significant results were found. Participants from the control group and treatment group showed similar improvements before and after treatment. The lack of significant effect could be caused by the low number of participants available to participate in this study. Because there was a decrease in MPA among participants in both groups, it can be noted that both the running treatment and the control, breathing exercise, had a positive impact on a majority of participants. From this information, further study could be done on the effect of a breathing exercise as the treatment rather than a control.

A content analysis was used for the open-ended responses that are given on the final MPA inventory for participants in the running treatment group to answer the question: What other outcomes do students report following the running treatment? Runners were asked if they planned to continue running after the treatment was completed and how it affected them personally and in performance. Seven of the ten participants in the treatment group said they would continue running. Two said they would not, and one said they would finish the running program. One of the participants who said they would not continue running said it was only because of lack of time. Nine of the ten participants reported the running treatment helped them in some aspect of performance or life. The question asks: How has the running treatment affected you musically or otherwise? One participant said it had not affected them much and they preferred other forms of exercise. This participant did not complete the treatment, and completed less of the running treatment than any other participant in the treatment group.

The other participants reported having more confidence than usual, extra motivation, and used the runs as a time to de-stress. Wind players also reported feeling like they had more lung capacity. The full responses from each participant is located in chapter four.

I used a correlation to determine if improved perceived MPA relates to improved cardiovascular health. Cardiovascular health was measured at the beginning and end of the study by the six-minute walk test. If the participant was able to walk a greater distance after the treatment then cardiovascular health has improved. Distance walked during the six-minute walk test was measured using the MapMyRun application. There was no effect. Seven of the ten participants did make slight improvements from the pre-treatment six-minute walking test, to the post-treatment six-minute walking test. The three people who made no improvement from the pre-treatment walking test to the post-treatment walking test did not complete the running treatment.

A correlation was used to answer the secondary research question: Does perceived levels of MPA among participants vary based on degree concentration, instrument, gender, and age? The demographic information for this question was gathered using the background information form collected from all participants before the start of the study. The only correlations found were degree concentration to cardiovascular improvements and degree concentration to treatment completion. Music education majors had the greatest cardiovascular health, jazz the second, and performance with the smallest increase. The correlation between degree concentration and treatment completion showed the same results. It should be noted that only one of the participants in the running group was a music education major and only two were jazz studies.

Implications

Although there were no significant results found, it is implied that mindfulness and physical activity are important to incorporate in the classroom. Those who completed the breathing exercise in the control group and those who completed the running treatment had similar results. The majority of participants reported lower levels of perceived music performance anxiety. One participant reported no change in music performance anxiety and three reported more anxiety on the post-test than the pre-test. Fifteen out of the 19 participants did show positive results.

Participants in the treatment group were given two additional questions that were free response about their experience with the running treatment. In these responses seven of the ten participants said they would continue to run after the completion of the study. Nine out of ten participants reported that the running treatment affected their performance positively by reporting increased confidence, lower levels of stress and anxiety and an increase in motivation. Wind players who participated in the treatment group reported greater breath support and lung capacity.

It is common practice for choir and other vocal classes to implement stretching and breathing exercises at the beginning of the class. It would be useful for band and orchestra classes to incorporate this as well. A five minute breathing and stretching warm-up before beginning rehearsal could be beneficial for students over time. It would be beneficial for teachers who have extra time to offer an after school exercise group for music students. This would also allow for more bonding among ensemble members. Rebecca Adkins, a music teacher at Huntington High School in Huntington, WV started an afterschool exercise program with her students and reported seeing a change in her

students(R. Adkins, personal communication, April 30, 2016). “We do a lot of acro-yoga afterschool. It not only is good exercise, it builds trust between the kids and the kids with me. The exercising has helped keep the kids focused on the other days we don’t exercise. It has helped with their stamina while we are working…(personal communication, April 30, 2016)”

Teachers should also make it a point to talk with their students about MPA. It is important to explain what the students may feel physiologically and psychologically before their first performance and talking with students about MPA should not be limited. It should be a topic of conversation throughout all years of performing in order to deteriorate the stigma associated with MPA.

Limitations

This study was limited by time. There was a small window of time after receiving IRB approval to recruit for participants and start the study within the time allotted by the University for thesis completion. There was also a limitation on the number of classrooms I had the ability to speak in front of about this study. Recruitment mostly occurred on Fridays during studio classes or instrumental music forums. Many of these classes overlapped, making it impossible to attend all of them for the study to begin on time.

Due to the rigorous academic and performance demands at the University of Miami, many students felt too stretched to participate in this study. Originally, 48 names and e-mails of interested students were collected. After sending out paperwork and a number of e-mails, only 20 agreed to follow through with the study and 19 passed the PAR-Q requirement to participate in the study.

Some participants in the treatment running group also had difficulties with completing and keeping up with the study. Only six participants completed the entire treatment plan. The four who did not complete the treatment made it to week three or beyond. The participants who only partially completed the running treatment experienced were also more sporadic with placement of the runs. One participant went over a week without completing a run and then attempted to catch up by placing five runs in one week. This proved to be too much and the participant fell behind again due to delayed onset muscle soreness (DOMS).

Recommendations for Future Research

This study only covered instrumental musicians and should include or singularly focus on vocal students in the future to compare results. Vocalists were not used for this study because the difference in physiological music performance anxiety symptoms.

This study only allowed students from the Frost School of Music to participate. It would be possible to gain more data if it was open to students from other universities throughout the United States. Other populations such as high school students and professional musicians should also be included in future research.

Only 6 of 10 participants in the treatment group completed the treatment. The four who did not complete the treatment reached at least week three in the running treatment plan, but also tended to spread their runs out more than what the instructions for the running program allowed. The four participants with incomplete treatments also showed less or negative difference in the six-minute walk test which measured cardiovascular health when compared to those who completed the treatment. Future research on this topic should allow for more time for participant recruitment and for participants to

complete the running treatment. It may also help to have a weekly meeting with those in the treatment group to discuss running techniques, scheduling strategies, and how to stay motivated.

Khalsa, et al (2013) found significant results when giving a yoga treatment to students at the Boston Tanglewood Institute. These results used three inventories to measure participant MPA levels before and after performance. One of these was an MPA-I for adolescents similar to the Kenny MPA-I. The yoga study also used a State-Trait Anxiety Inventory and a Performance Anxiety Questionnaire. It is recommended that future research incorporate more measurements of MPA to obtain more data. Future research may also benefit from creating a new measure using participant responses from the treatment group. Khalsa, et al (2013) also used a control group that did nothing. This may benefit future research because the control used for this study is associated with yoga that has shown a significant change in MPA in previous studies.

It is also recommended that future research control the performance environment that participants use to complete the MPA-I. A private lesson may be significantly less pressure for some students than others. This could also account for the small difference in some participants from pre-test to post-test. Future research could also measure student perception of MPA in different performance scenarios to find which would be most applicable for that particular participant.

There were no significant results found in this study, but there was a small difference between the pre-treatment MPA-I and the post-treatment MPA-I in the control and the running group. This implies that doing something, whether it be a breathing exercise or running, can improve perceived levels of MPA. It is important to emphasize

health and well being to students in all types of performing music classes. This can be accomplished through a daily five-minute warmup of breathing and stretching, providing your ensemble with an after-school exercise group, and class discussions about the physiological and psychological symptoms that come with MPA. There is still a need for more research on this topic with a larger number of participants.

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APPENDIX A: RAW DATA

Control Group

Participant	Pre-Test	Post-Test	Difference
1	61	67	6
2	47	61	14
3	54	58	4
4	44	44	0
5	45	60	15
6	45	51	6
7	36	68	32
8	54	71	17
9	44	40	-4
MEAN	47.8	57.8	10

Treatment Group

Participant	Pre-Test	Post-Test	Difference
1*	54	57	3
2*	62	61	-1
3*	61	59	-2
4	44	60	16
5	70	75	5
6	37	46	9
7	54	56	2
8	38	52	14
9*	41	45	4
10	43	65	22
MEAN	50.4	57.6	7.2

Runner Open Response One

Participant	Do you plan to continue running after this study?
1*	Yes.
2*	I will finish the Program.
3*	Yes.
4	Yes.
5	I will not continue running simply because I do not have the time.
6	Yes.
7	Yes.
8	Yes.
9*	Yes.
10	No.

*Denotes participants who did not complete the treatment.

Runner Open Response Two

Participant	In your own words, how has the running treatment affected you musically or otherwise?
1*	I will say that I did not finish the program as I ran into scheduling problems. Even though I finished half of the study, the benefits were noticeable. At the first orchestra concert I found that there wasn't any anxiety, just excitement. I also found that I had more energy; I usually lose energy after the first half of the concert.
2*	It hasn't affected me very much. I try to exercise when I have time. I prefer the gym to running because it is not so hard on my knees. It was good motivation though.
3*	It is a great tension release tool. I am building in running and other types of exercise into my daily routine.
4	I think running has boosted my self-confidence while performing. I would try to run when I was anxious and it helped calm my mind down.
5	I enjoyed the study because running helped me de-stress, and it was my me-time. I did not have to worry about anyone else or anything.
6	The challenge of running has increased my confidence while performing. The mental effects have been positive overall for my self-esteem and health. I have needed more rest days in between runs to prevent injury and properly heal, but the running lengths have been more attainable than I originally thought.

7	The running treatment has helped me to increase my mental endurance. I think that I can focus on controlling my breathing and releasing tension for a longer amount of time while I am performing than before the running treatment. The running treatment has also helped me to increase my lung capacity. I feel like I can take bigger breaths when I play, which would help during a performance.
8	I feel better equipped to slow my breathing and/or heart rate if nervous. I also know that my threshold of prolonged physical activity has increased, which leads me to believe that it has helped my breath support when playing as well as improving my general quality of life.
9*	Running helped me focus on the bigger picture in my music. For example, making a goal to reach the next streetlight while running became parallel to creating a compelling arc in a phrase or song. I think physical activity in general helps with my stress levels and increases confidence, which helps when I prepare for a performance or high-pressure situation.
10	It gave me determination to practice and it helped with my performance stress. During my lesson I didn't feel much stress; and when I performed in studio last Friday, I felt more comfortable than I ever have when playing in front of an audience of my peers.

*Denotes participants who did not complete the treatment.

Six-Minute Walking Test Results

Participant	Pre-Treatment six-minute walking test	Post-Treatment six-minute walking test	Difference
1*	.30	.28	-.02
2*	.62	.41	-.21
3*	.62	.41	-.21
4	.28	.31	.03
5	.35	.53	.18
6	.35	.40	.05
7	.29	.30	.01
8	.30	.33	.03
9*	.33	.35	.02
10	.30	.32	.02

*Denotes participants who did not finish the treatment

APPENDIX B: CONSENT FORM

Title of research study: The Influence of a Running Treatment on Music Performance Anxiety

Investigator: Principal Investigator: Stephen Zdzinski, Student Investigator Molly Page

Why am I being invited to take part in a research study?

We invite you to take part in a research study because you are a music student at the Frost School of Music.

What should I know about a research study?

- Someone will explain this research study to you.
- Whether or not you take part is up to you.
- Participation is Voluntary
- You can choose not to take part.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team at ***mlp51@miami.edu***
This research has been reviewed and approved by an Institutional Review Board ("IRB"). Please contact the University of Miami Human Subject Research Office at (305) 243-3195 if:

- You wish to talk to someone other than the research staff about your rights as a research subject.
- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to provide input concerning the research process

Why is this research being done?

The purpose of this research is to determine if a running treatment can reduce perceived music performance anxiety among music students.

How long will the research last?

We expect that you will be in this research study for 6 weeks. The running treatment occurs three times a week for approximately thirty minutes. It is flexible and can be completed whenever your schedule allows.

How many people will be studied?

We expect about 48 people here will be in this research study.

What happens if I say yes, I want to be in this research?

After giving your consent, you will be asked complete a questionnaire about your ability to do physical activity. If you answer yes to any questions on the PAR-Q you will not be cleared for treatment. If you are cleared, you will take a six minute walk test to measure your cardiovascular health, and how far you are able to walk in six minutes.
You will then be randomized into one of the two groups.You will have a one in two chance of being placed in each group. If you are placed in group one you will follow a running treatment plan. You will be asked to download the free MapMyRun application to your smart phone. You will be given a name and password specific to this study so the researchers can get your data. You will also be required to watch a video that explains proper running technique, attire, and hydration for your own safety. You will be given a plan in case an emergency occurs while running. If you are placed in group two, you will not run, but instead do a breathing exercise before performances.
Both groups will be given a background form and music performance anxiety questionnaire to fill out before the start of the study. Both groups will also fill out a music performance anxiety questionnaire at the end of the study. Those in the running groups will also complete another six-minute walk test at the end of the study to see if there has been changes in overall cardiovascular health.

Group One Specific Information

You will be asked to follow the running plan below. This plan is flexible and can be completed at any time of the week that your schedule allows.

W= Walk, R= Run, # = minutes

Week	Day 1	Day 2	Day 3
1	W 5 R 2, W 3; R 2, W 2 R 2, W 3; R 2, W 9	W 5 R 3, W 3; R 3, W 3 R 3, W 10	W 5 R 3, W 2; R 3, W 2 R 3, W 2; R 3, W 5
2	W 5 R 5, W 3; R 4, W 3 R 3, W 7	W 5 R 6, W 3 R 6, W 3	W 5 R 5, W 2; R 6, W 2 R 5, W 2; R 5, W 7
3	W 5 R 12, W 3	W 3 R 15, W 3	W 3 R 10, W 3; R 7, W 2
4	W 3 R 10, W 4; R 5, W 2	W 3 R 20, W 2	W 3 R 2, W 2; R 10, W 5
5	W 5 R 10, W 3; R 10, W 2	W 5 R 25	W 3 R 2, W 2; R 10, W 5
6	W 5, R 30	R 20	W 5, R 30

Group Two Specific Information:

You will be asked to follow the following breathing exercises before performances:

-Close off the left nostril with your thumb, breath in. Then hold down right nostril with the index finger of the same hand and breathe out. Repeat for five minutes

- Inhail through both nostrils for four counts and out for four counts, repeat for five, six, seven, and eight counts.

What are my responsibilities if I take part in this research?

If you take part in this research, you will be responsible to: complete the treatment plan that is outlined above according to the group you are placed in, questionnaires on music performance anxiety, and medical screening and background information.

What happens if I do not want to be in this research?

You can leave the research at any time and it will not be held against you.

What happens if I say yes, but I change my mind later?

You can leave the research at any time it will not be held against you.

Is there any way being in this study could be bad for me?

The risks are typical from any exercise training program. Programs similar to this one have been used repeatedly with multiple populations.

Risks Include:

- Shortness of breath and mild discomfort when first adapting to the exercise demand
- Delayed onset muscle soreness (DOMS) on the days following the initial training sessions. DOMS typically last 2-3 days and can range from slight soreness of the muscle to the inability to move the affected muscle. The level of DOMS will be expected to decrease dramatically after the initial 3-4 training sessions.
- Sprains, strains, or fractures if the subject trips and falls.
- Possible heart attack or stroke due to physical activity
- In addition there may be uncommon or previously unknown risks that might occur. If these occur, you are asked to report any problems and ask any questions to the research staff.

The researcher will give you an emergency plan on what to do in the case of an adverse reaction. The student researcher is certified in CPR and has a protocol in place if a cardiac event occurs.

You and your insurance company will be charged for the health care services that you would ordinarily be responsible to pay. In some cases, insurance will not pay for services ordinarily covered because these services were performed in a research study. You should check with your insurance to see what services will be covered by your insurance and what you will be responsible to pay. Frost school of Music has no program to pay for medical care for research-related injury.

Will being in this study help me any way?

We cannot promise any benefits to you from your taking part in this research. However, you may have increased cardiovascular health due to increased physical activity and a possible reduction in music performance anxiety.

What happens to the information collected for the research?

Efforts will be made to limit the use and disclosure of your personal information, including research study and medical records, to people who have a need to review this information. We cannot promise complete secrecy. Organizations that may inspect and copy your information include the IRB and other representatives of this organization.

Signature Block for Capable Adult
Your signature documents your permission to take part in this research.

Signature of subject	Date
Printed name of subject	
Signature of person obtaining consent	Date
Printed name of person obtaining consent	IRB Approval Date

APPENDIX C: MPA-I

Adaptation of the Kenny Music Performance Anxiety Inventory

Participants will answer on a scale of 1-5 (1= Strongly Agree, 2= Agree 3= Neutral 4= Disagree, 5= Strongly Disagree)

Circle the number that best describes your experiences.

1 2 3 4 5	Performing for memory increases my nervousness
1 2 3 4 5	I try to avoid solo performances
1 2 3 4 5	I would rather play in a group or ensemble, rather than by myself
1 2 3 4 5	I would rather give a solo performance
1 2 3 4 5	I prefer to play in settings without an attentive audience
1 2 3 4 5	I worry that audience members my not like my performance
1 2 3 4 5	I worry that my teachers may not like my performance
1 2 3 4 5	I often worry about my ability to perform
1 2 3 4 5	Before I perform I get butterflies in my stomach
1 2 3 4 5	Before I perform, I tremble or shake
1 2 3 4 5	Just before I perform, I feel nervous
1 2 3 4 5	When I perform in front of an audience, my heart beats very fast
1 2 3 4 5	When I perform I find it hard to concentrate on the music
1 2 3 4 5	When I perform in front of an audience, I am afraid of making mistakes
1 2 3 4 5	When I perform in front of an audience I get sweaty hands
1 2 3 4 5	If I make a mistake during performance, I panic, leading to more mistakes

1 2 3 4 5	When I finish performing, I usually feel happy with my performance
1 2 3 4 5	My muscles feel tense when I perform

APPENDIX D: MPA-I RUNNING

Adaptation of the Kenny Music Performance Anxiety Inventory

Participants will answer on a scale of 1-5 (1= Strongly Agree, 2= Agree 3= Neutral 4= Disagree, 5= Strongly Disagree)

Circle the number that best describes your experiences.

1 2 3 4 5	Performing for memory increases my nervousness
1 2 3 4 5	I try to avoid solo performances
1 2 3 4 5	I would rather play in a group or ensemble, rather than by myself
1 2 3 4 5	I would rather give a solo performance
1 2 3 4 5	I prefer to play in settings without an attentive audience
1 2 3 4 5	I worry that audience members my not like my performance
1 2 3 4 5	I worry that my teachers may not like my performance
1 2 3 4 5	I often worry about my ability to perform
1 2 3 4 5	Before I perform I get butterflies in my stomach
1 2 3 4 5	Before I perform, I tremble or shake
1 2 3 4 5	Just before I perform, I feel nervous
1 2 3 4 5	When I perform in front of an audience, my heart beats very fast
1 2 3 4 5	When I perform I find it hard to concentrate on the music
1 2 3 4 5	When I perform in front of an audience, I am afraid of making mistakes
1 2 3 4 5	When I perform in front of an audience I get sweaty hands
1 2 3 4 5	If I make a mistake during performance, I panic, leading to more mistakes

1 2 3 4 5	When I finish performing, I usually feel happy with my performance
1 2 3 4 5	My muscles feel tense when I perform

Do you plan to continue running after this study?

In your own words, how has the running treatment affected you-musically or otherwise?

APPENDIX E:BACKGROUND INFORMATION

Participant Background Information

Name:

Age:

Gender:

Major:

Degree Level (Undergrad, Masters, Doctoral):

Instrument:

Estimate the amount of time you exercise each week:

Type of exercise if applicable:

To be filled out by the research team:

Subject number:_____

6 minute walking test results: _____

Group: _____

If in a Running Group:
MapMyRun Username: _____ Password:_____

APPENDIX F: PAR-Q

Physical Activity Readiness Questionnaire - PAR-Q (revised 2002)

PAR-Q & YOU

(A Questionnaire for People Aged 15 to 69)

Regular physical activity is fun and healthy, and increasingly more people are starting to become more active every day. Being more active is very safe for most people. However, some people should check with their doctor before they start becoming much more physically active.

If you are planning to become much more physically active than you are now, start by answering the seven questions in the box below. If you are between the ages of 15 and 69, the PAR-Q will tell you if you should check with your doctor before you start. If you are over 69 years of age, and you are not used to being very active, check with your doctor.

Common sense is your best guide when you answer these questions. Please read the questions carefully and answer each one honestly: check YES or NO.

YES	NO		
☐	☐	1.	**Has your doctor ever said that you have a heart condition and that you should only do physical activity recommended by a doctor?**
☐	☐	2.	**Do you feel pain in your chest when you do physical activity?**
☐	☐	3.	**In the past month, have you had chest pain when you were not doing physical activity?**
☐	☐	4.	**Do you lose your balance because of dizziness or do you ever lose consciousness?**
☐	☐	5.	**Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?**
☐	☐	6.	**Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?**
☐	☐	7.	**Do you know of any other reason why you should not do physical activity?**

If you answered YES to one or more questions

Talk with your doctor by phone or in person BEFORE you start becoming much more physically active or BEFORE you have a fitness appraisal. Tell your doctor about the PAR-Q and which questions you answered YES.

- You may be able to do any activity you want — as long as you start slowly and build up gradually. Or, you may need to restrict your activities to those which are safe for you. Talk with your doctor about the kinds of activities you wish to participate in and follow his/her advice.
- Find out which community programs are safe and helpful for you.

NO to all questions

If you answered NO honestly to all PAR-Q questions, you can be reasonably sure that you can:

- start becoming much more physically active – begin slowly and build up gradually. This is the safest and easiest way to go.
- take part in a fitness appraisal – this is an excellent way to determine your basic fitness so that you can plan the best way for you to live actively. It is also highly recommended that you have your blood pressure evaluated. If your reading is over 144/94, talk with your doctor before you start becoming much more physically active.

DELAY BECOMING MUCH MORE ACTIVE:

- if you are not feeling well because of a temporary illness such as a cold or a fever – wait until you feel better; or
- if you are or may be pregnant – talk to your doctor before you start becoming more active.

PLEASE NOTE: If your health changes so that you then answer YES to any of the above questions, tell your fitness or health professional. Ask whether you should change your physical activity plan.

Informed Use of the PAR-Q: The Canadian Society for Exercise Physiology, Health Canada, and their agents assume no liability for persons who undertake physical activity, and if in doubt after completing this questionnaire, consult your doctor prior to physical activity.

No changes permitted. You are encouraged to photocopy the PAR-Q but only if you use the entire form.

NOTE: If the PAR-Q is being given to a person before he or she participates in a physical activity program or a fitness appraisal, this section may be used for legal or administrative purposes.

"I have read, understood and completed this questionnaire. Any questions I had were answered to my full satisfaction."

NAME _____

SIGNATURE _____ DATE _____

SIGNATURE OF PARENT or GUARDIAN (for participants under the age of majority) _____ WITNESS _____

Note: This physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if your condition changes so that you would answer YES to any of the seven questions.

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