Comparing Effects of Cognitive Behavioral and Mindfulness, Acceptance, and Commitment
Interventions on Performance Anxiety in a Music Context

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By

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Thesis Approval
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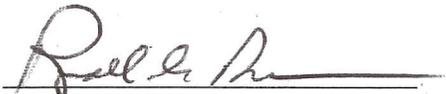
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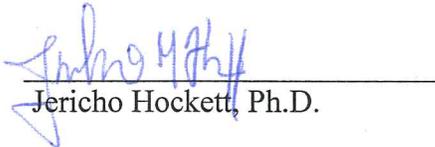Chair of the Thesis Committee

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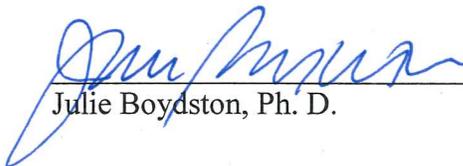Vice President for Academic Affairs

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To My Parents,

   Thank you for your support. You have always believed in me and encouraged me to follow my dreams. You accept me as I am and never doubt my capabilities. I am thankful for your continued love and guidance. I wouldn't be where I am today if it weren't for the undying love and support you have unconditionally given me. My successes over the last 26 years are attributed to the fact that you have always given me the courage and motivation to soar. You have taught me to dream fearlessly. In times of weakness, you have given me strength. You have unselfishly put my needs before your own, and you are the reason I've progressed so well and continue to thrive. We may have had our fair share of difficulties along the road but we have each other, and that's all I could ever ask for. I love you both so very much.

Thank you for being such wonderful parents, mentors, and friends.

All My Love,

Jonathan

Comparing Effects of Cognitive Behavioral and Mindfulness, Acceptance, and Commitment

Interventions on Performance Anxiety in a Music Context

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Abstract

The purpose of this study was to compare the effects of two interventions based on cognitive behavioral (CB) and mindfulness, acceptance, and commitment (MAC) approaches against a no-treatment control group on reducing the symptoms of written examination and audio performance anxiety. Three sections of an undergraduate general education music course participated in the study ($N = 104$), with each assigned to one of three conditions: a) CB intervention ($n = 40$), b) MAC intervention ($n = 26$), and c) no-treatment control group ($n = 38$). All participants completed pre- and post-test measures that included measures of knowledge of, and attitudes toward, CB and MAC theories and concepts, and performance anxiety. Additional dependent variables were obtained via participants' provision of permission to release their written examination and audio performance scores from their midterm and final exams. The participants in the CB and MAC intervention received two 20-minute PowerPoint informational lectures that described the fundamental theoretical principles and concepts of their assigned condition. Pre-existing differences were controlled for in subsequent analysis. Results suggest that both the CB and MAC interventions were effective in increasing participants' knowledge of these approaches. In addition, the CB and MAC interventions were effective in increasing audio performance from midterm to final examination. This suggests that CB and MAC interventions may be appropriate for improving performance within a music context specifically.

Comparing Effects of Cognitive Behavioral and Mindfulness, Acceptance, and Commitment

Interventions on Performance Anxiety in a Music Context

What public speaker has never experienced weak knees and sweaty palms, what runner or

swimmer the 'butterflies in the belly,' what teacher the vision of being eaten alive by the

'dear little ones' he faces, what trumpeter the terrors of the high C, what soccer goalie the

specific fears of the eleven meter goal attempt, the field-goal kicker the infinite

possibilities of failure? If we care to admit it, probably all of us are intimately familiar

with this specific fear. It is conjured up by being in the limelight or onstage, subject to the

censure of our referees and rivals. (Krüger, 1993, p. 9)

Tests, examinations, and performances have become an essential part of the evaluation

process used in educational institutions and career development. Successful performance on

events can ensure financial, professional, and personal success; while failure may result in

accepting less preferred educational opportunities, lack of employment, and financial instability.

Krüger (1993) acknowledged that performance anxiety occurs in a variety of contexts and has

the potential to affect individuals to a debilitating extent. Current research has demonstrated the

detrimental effects performance anxiety can have on test-taking (Elliot, McGregor, & Gable,

1999), music performance (Brown & Ryan, 2003), public speaking (Merritt, Richards, & Davis,

2001), sexual performance (Birk, 2004), sports (Hanton, Mellalieu, & Hall, 2002), and the

performing arts such as acting (Wilson, 2002) and dance (Tamborrino, 2001). In fact, McGinnis

and Milling (2005) found remarkably similar effects of anxiety on performance in a comparison

of public speaking, test taking, and sports contexts. The purpose of this study is to provide

empirical evidence of the most effective mode of treatment for those suffering from performance

anxiety— specifically music performance anxiety—to inform future therapeutic practice.

Literature Review

Prevalence and Treatment of Generalized Anxiety Disorder

The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association, 2013) states the prevalence of generalized anxiety disorder (GAD) among the United States general population is 0.9% among adolescents, and 2.9% among adults. It is one of the most frequently diagnosed anxiety disorders with a lifetime prevalence estimated from 5.7% (Kessler & Wang, 2008) to 9% (American Psychiatric Association, 2013) and is commonly associated with other disorders (Brown, Antony, & Barlow, 1992). GAD symptoms include restlessness or feeling on edge, fatigue, impaired concentration, irritability, muscle tension, and sleep disturbance. Furthermore, some individuals may experience physical symptoms such as sweating, nausea, or incontinence. These symptoms tend to persist unless successfully treated (Yonkers, Bruce, Dyck, & Keller, 2003) and may make it difficult for the individual to carry out their responsibilities, causing problems in their relationship, work, or other important areas.

Cognitive behavioral (CB) based approaches have been used successfully in practice as a form of intervention to assist those with symptoms associated with GAD (Craske & Barlow, 2006). The emphasis within the CB approach is to help clients understand how their thoughts and feelings influence their behaviors. This is done through reframing and/or replacement of current maladaptive thoughts, and an active intentional elimination or alteration of previous behaviors. The goal is to teach the client that, while they cannot eliminate or avoid the occurrence of stressful life events, nor can they control every aspect of their thoughts or emotions, they can learn to control how they interpret stimuli within their environment. New interpretations may be gained through the identification of recurring cognitive distortions or logical fallacies, and the

application of interventions based in cognitive behavioral therapy (CBT) that encourage

development and integration of thought patterns that are more adaptive.

CB-based interventions, such as CBT, are identified as the empirically-validated

treatment of choice for broader spectrum anxiety disorders such as GAD and social anxiety

disorder (Hope, Heimberg, & Turk, 2010). Andrews, Cuijpers, Craske, McEvoy, and Titov

(2010) analyzed 22 studies and found that the CB-based interventions demonstrated superior

outcomes for anxiety and depression when compared to the control groups for overall disorders

($g = .88$[1]) and for GAD specifically ($g = 1.12$). According to a study conducted by Titov et al.

(2009), which focused on CB-based interventions and GAD symptoms specifically, significant

reductions ($g = 1.08$) in GAD symptoms were reported compared to the randomized control

group at post-treatment. Similarly, a study conducted by Robinson et al. (2010) emphasizing CB-

based interventions revealed significant reductions ($g = 1.13$) in reported GAD symptoms when

compared to the randomized control group at post-treatment. In addition, secondary outcomes

such as depression, psychological distress, and disability, when treated with a CB-based

intervention, were commonly reduced in these studies (Robinson et al., 2010; Titov et al., 2009).

Other meta-analyses have supported CBT's effectiveness in reducing general anxiety symptoms

and pathological worry (Borkovec & Ruscio, 2001; Covin, Ouimet, Seeds, & Dozois, 2008;

Westen & Morrison, 2001). These studies suggest that CB-based interventions are an efficacious

and acceptable treatment for GAD.

In recent years, therapeutic interventions based on concepts of mindfulness, acceptance,

and commitment (MAC) have gained popularity. MAC-based interventions have been used in

practice across a wide range of clinical diagnoses, including anxiety disorders (Fairholme,

Boisseau, Ellard, Ehrenreich, & Barlow, 2010). According to Gardner and Moore (2007), the

emphasis within the MAC approach is achieving a modified relationship with one's internal

experiences, by pursuing "flow" states where internal experiences such as thoughts and emotions

are acknowledged and then "released." The MAC-based approach is in direct contrast to the

more active and intentional elimination, reframing, and replacement of maladaptive thoughts

espoused by CB-based approaches.

A recent research study demonstrated improvements resulting from the application of

MAC-based approaches to mixed-anxiety disorders (including GAD), comparable to results from

CB-based approaches (Arch et al., 2012). More specifically, the MAC-based intervention group

demonstrated significant reduction at post-treatment in their clinical severity rating ($d = .82^2$)

along with the CB-based intervention group ($d = .84$). According to a study conducted in 2011

by Treanor, Erisman, Salters-Pedneault, Roemer, and Orsillo, a MAC-based intervention

demonstrated a significant decrease in distress over emotional responses ($d = 1.42$) and

intolerance of uncertainty ($d = 1.83$) at post-treatment. In addition, an even more recent study

conducted by Hayes-Skelton, Roemer, & Orsillo (2013) emphasizing MAC-based interventions

demonstrated significant change at post-treatment in trait anxiety ($d = 1.57$) and GAD clinical

severity ratings ($d = 1.47$). In 2008, Roemer, Orsillo, and Salters-Pedneault conducted a wait-list

randomized controlled trial that implemented MAC-based interventions. This study

demonstrated significant effects on self-reported measures of anxiety ($d = 1.02$), depression ($d = 1.06$), and quality of life ($d = .56$) at post-treatment when compared to the control group. These

authors also reported a high effect size ($d = 1.04$) for the MAC-based participants' scores on the

Mindful Attention Awareness Scale (Brown & Ryan, 2003), suggesting the participants had

become more naturally mindful following treatment. Additionally, a meta-analysis conducted by

Hofmann, Sawyer, Witt, and Oh (2010) demonstrated an only slightly weaker relationship

between MAC-based interventions and the reduction of anxiety generally at post-treatment ($g =$ .60). It can be concluded that while existing research provides support for MAC-based interventions in the treatment of anxiety disorders, additional research is needed before MAC-based interventions are promoted as being equally effective as the more established CB-based interventions.

Prevalence and Treatment of Social Anxiety Disorder

Social anxiety disorder (SAD) has also been shown to impair performance in a number of areas. According to the *DSM-5* the prevalence of SAD among the United States general population is greater than the prevalence of GAD, with 7% of adults, and a comparable proportion of children endorsing the symptom cluster of SAD (American Psychiatric Association, 2013). The 12-month prevalence rate for older adults ranges from 2% to 5%. In addition, SAD is often comorbid with many other anxiety, depressive, and substance use disorders (American Psychiatric Association, 2013). Social anxiety symptoms focus on anxiety about social situations due to possible scrutiny by others, and the fear of displaying anxiety symptoms followed by negative evaluation from others. In addition, the anxiety experienced by the individual is often out of proportion to the actual threat of the social situation. Similar to GAD, symptoms such as a rapid heartbeat, shaking, sweating, nausea, or incontinence may occur within SAD. These symptoms may be extremely debilitating and may cause impairment within the individual's education, employment, and social functioning (Aderka et al., 2012). If untreated, SAD is often considered to follow a chronic course (Reich, Goldenberg, Vasile, Goisman, & Keller, 1994).

CB-based interventions have demonstrated effectiveness in the treatment of SAD. Within controlled studies, effect sizes in the range of *d* = 0.70 (Acarturk, Cuijpers, Van Straten, & De

Graaf, 2009) to $d = 0.86$ (Powers, Sigmarsson, & Emmelkamp, 2008) have been reported. A

more recent study by Ginsburg, Becker, Drazdowski, and Tein (2012) revealed similar results,

and demonstrated a moderate post-treatment effect size ($d = .58$) as measured by the Severity

subscale of the Clinical Global Impressions Scale (Guy, 1976). In a meta-analysis of 16 studies

utilizing CB-based interventions to treat SAD (Gould, Buckminster, Pollack, Otto, & Yap, 1997)

a medium within-group effect size ($d = .80$) at post-treatment was reported for exposure-based

interventions coupled with cognitive restructuring. Cognitive restructuring is a psychotherapeutic

process which encourages clients to identify and dispute irrational or maladaptive thoughts

known as cognitive distortions, fallacies, or thinking errors. In this approach, clients are

counseled on how to restructure their thoughts in order to change how they interpret and think

about their experiences (Beck, Rush, Shaw, & Emery, 1979; Clark, 1999). When used alone, and

absent the exposure element, cognitive restructuring produced a lower effect size ($d = .60$).

Another meta-analysis of randomized clinical trials involving placebo controls reported a

comparison-weighted grand mean effect size of $d = .95$ from pre- to post-treatment (Butler,

Chapman, Forman, & Beck, 2006). It can be concluded that the effectiveness of CB-based

interventions for SAD has been well documented.

MAC-based interventions have demonstrated preliminary evidence of clinical

improvement in patients with SAD (Arana, 2006). A 2007 study by Koszycki, Benger, Shlik, and

Bradwejn, where 26 individuals participated in a MAC-based intervention, reported a strong

post-treatment effect size of $d = .81$ on the Social Interaction Anxiety Scale (Mattick & Clarke,

1998) and a higher post-treatment effect size of $d = 1.44$ on the Leibowitz Social Anxiety Scale

(Liebowitz, 1987). In addition, participants in the research by Koszycki et al. (2007) also

revealed a high effect size of $d = .67$ on the Beck Depression Inventory (Beck, Ward,

Mendelson, Mock, & Erbaugh, 1961) and a high effect size of $d = .54$ on the Quality of Life

Inventory (Frisch, Cornell, Villanueva, & Retzlaff, 1992). Another study containing nine

participants (Bogels, Sijbers, & Voncken, 2006) demonstrated high effect size at post-treatment

($d = .85$) and 2-month follow-up ($d = .98$) as measured by the Social Phobia and Anxiety

Inventory (Turner, Beidel, Dancu, & Stanley, 1989). This study also noted a similar change at

post-treatment ($d = .83$) and 2-month follow-up ($d = 1.30$) in the clients fear of negative

evaluation measured by the Negative Evaluation Scale (Watson & Friend, 1969). It can again be

concluded that while the utilization of MAC-based interventions for SAD has gained some

support in the empirical literature, further research should be conducted to determine its

effectiveness in direct comparisons to CB-based interventions.

Prevalence and Treatment of Performance Anxiety

According to *DSM-5* (American Psychiatric Association, 2013), SAD contains a specifier

noted as "performance only." This specifier may be placed along with the primary diagnosis and

shares many similar symptoms. However, individuals with performance only-SAD experience

symptoms of social anxiety in a more limited scope, and do not fear or avoid non-performance

social situations. This specifier is usually given if the individual has a performance fear that is

impairing their professional effectiveness (e.g., as musicians, dancers, actors, athletes). In

addition, this specifier is often given when the individual's profession requires regular public

speaking or performances during which the individual experiences debilitating anxiety. Social

anxiety, specifically the performance only type, affects numerous adults and negatively

influences their responsibilities, education attainments, and social functioning (Stein, Torgrud, &

Walker, 2000).

A study by Tillfors et al. (2008) treating university students with a CB-based intervention for public speaking fears revealed high effect sizes at post-treatment as measured by the Liebowitz Social Anxiety Scale ($d = .82$) and the Social Interaction Anxiety Scale ($d = .77$). Furthermore, the study demonstrated high effect sizes at one-year follow-up on the same measures $d = .96$ and $d = .59$, respectively. The only available meta-analysis on performance only social anxiety/fear of public speaking (Allen, Hunter, & Donohue, 1989) reviewed studies that used the Personal Report in Confidence in Speaking Scale (Gilkinson, 1943) and other comparable scales as the dependent measure to examine the effectiveness of CB-based interventions. This meta-analysis reported effect sizes at post-treatment ranging from $d =.01$ to $d = .87$.

As previously discussed, the scientific literature includes the application of MAC-based approaches to reduce broader GAD and SAD anxiety symptoms in medical patients and healthy individuals. However, no studies have investigated the application of MAC-based approaches in the treatment of more narrowly defined anxiety disorders such as performance only-SAD. Instead, research on the application of MAC-based interventions has focused on performance enhancement, not the reduction of anxiety specifically. This research will be reviewed later in this document.

Prevalence and Treatment of Test Anxiety

Test anxiety has been shown to negatively affect high school and college students through cognitive interference, with worry before examinations leading to reduced material comprehension, and inhibition of successful performance during examination (Carden, Bryant, & Moss, 2004; Cassady & Johnson, 2002). Gregor (2005) noted that between 10% and 40% of all students suffer from test anxiety at some level. Furthermore, research has suggested that students

with disabilities, females, and minority students report higher test anxiety (Putwain, 2007; Sena, Lowe, & Lee, 2007; Zeidner, 1990) compared to students who are fully-abled, male, or members of the ethnic majority group, respectively. More specifically, research has suggested that females are two or three times more likely to experience test anxiety than males (Kenny, 2006; Osborne, Kenny, & Holsomback, 2005; Rae & McCambridge, 2004).

CBT has been found to be effective and is often utilized to reduce impairments in performance related to test anxiety in academic settings (Ergene, 2003). A recent study by Weems et al. (2009), containing 73 students receiving a CB-based intervention, demonstrated a high effect size at post-treatment of $d = 1.2$ as measured by the Test Anxiety Scale for Children (Sarason, Lighlhall, Davidson, Waite, & Ruebush, 1960). In addition the students in the study by Weems et al. (2009) also obtained a positive change in grade point average ($d = .49$) at post-treatment. Similarly, Yahav and Cohen (2008) implemented a CB-based intervention to 14-16 year old students. The students were exposed to psycho-education regarding the cognitive model of stress and were provided the opportunity to identify stressors using adaptive thoughts while learning about the relationship between thoughts and emotions. The study demonstrated a high effect size at post-treatment of $d = .60$ as measured by the State Trait Anxiety Inventory for Children (Spielberger, 1973).

Despite the interest in the application of MAC-based interventions in the treatment of the subtypes of anxiety disorders defined by *DSM-5*, fewer studies have examined the potential benefits MAC-based interventions may have on test anxiety specifically. A recent study (Jain, Shapiro, & Swanick, 2007) involving medical and graduate nursing students examined the students' anxiety in relation to school as a whole. This study provided a direct comparison between a MAC-based intervention, relaxation training, and a no-treatment control group. The

MAC-based intervention ($d = 1.36$) and relaxation training ($d = .91$) demonstrated high effect

sizes at post-treatment that exceeded that of the control group ($d = .27$) as measured by the Brief

Symptom Inventory (Derogatis, 1993). Another study by Shapiro, Brown, and Biegel (2007)

demonstrated similar results while looking at therapists-in-training and their anxiety while in

graduate school as a whole. The study contained 22 participants enrolled in a MAC-based

intervention and 32 participants enrolled in a control group, which consisted of weekly meetings.

The interventions lasted 10 weeks in total and demonstrated high effect size ($d = 1.01$) at post-

treatment compared to the control group ($d = -.16$) as measured by the Perceived Stress Scale

(Cohen, Kamarck, & Mermelstein, 1983). In addition, these students were administered the

Mindful Attention Awareness Scale at pre-and post-treatment. The Mindful Attention Awareness

Scale demonstrated medium effect size ($d = .37$) at post-treatment for those who participated in

the MAC-based intervention, suggesting these participants became more mindful.

Prevalence and Treatment of Music Performance Anxiety

Music Performance Anxiety (MPA), a type of performance anxiety often experienced by

musicians, is evidenced by physical symptoms such as increased muscle tension and trembling

(Merritt et al., 2001). In addition, MPA has been known to cause emotional distress such as

feelings of guilt and shame (Lee, 2002), and even behavioral problems such as forgetting parts of

a piece due to temporary memory loss or finger mistakes (Lee, 2002; Mishra, 2002; Powell,

2004). Research has documented a similar constellation of symptoms producing vocal problems

related to performance anxiety in singers (Merritt et al., 2001). In a survey of 2,212 professional

orchestral musicians, a total of 40% reported having experienced some impairment from MPA,

with 24% of participants reporting MPA at a level of intensity they considered problematic, and

16% having experienced MPA as a severe problem (Marchant-Haycox & Wilson, 1992).

Efforts to identify the mechanisms that promote performance anxiety have focused on negative internal dialogues such as cognitive distortions or irrational beliefs (e.g., fortune telling, mind reading, labeling) as the main cognitive characteristics of anxious performers (Fehm & Schmidt, 2006; Kenny, 2005; Rodebaugh & Chambless, 2004). Furthermore, Bitran and Barlow (2004) discussed how theoretical explanations related to social anxiety and performance anxiety have accurately emphasized cognitive factors as essential for understanding the relationship between anxiety and the quality of the musical performance.

The singular example of a controlled research study that directly examined the impact of CBT on MPA was conducted by Clark and Argas (1991). These researchers compared the effects of CBT and the pharmacological agent Buspirone, an anxiolytic psychotropic drug often used to treat GAD, on MPA within a group of musicians. The study compared three treatment groups: CBT and Buspirone medication, CBT and placebo medication, and the Buspirone medication alone. Results from this study indicated that the combined CBT and Busprione group showed a reduction in subjective anxiety during their musical performance, which demonstrated low effect size at immediate post-treatment ($d = .04$), but high effect size at one-month follow-up ($d = .87$). Similar results were reported for the CBT and placebo group, with small effect size at immediate post-treatment ($d = .20$), but large effect size at one-month follow-up ($d = 1.33$). The Buspirone medication alone group produced small changes in the subjects' perception of anxiety during their musical performance, which revealed small effect size at both immediate post-treatment ($d = .01$) and one-month follow-up ($d = .27$). This study suggests that CBT alone may be an appropriate mode of treatment for MPA, the empirically supported treatment approach, in that inclusion of pharmacological agents may not improve outcomes.

In recent years, MAC-based interventions have been proposed as an alternative approach to CB-based mental skills training for enhancing human performance (Gardner & Moore, 2004). While Gardner and Moore proposed that MAC-based interventions could be used to enhance the performance of a wide range of performers, such as public speakers, musicians, vocalists, and actors, the primary tests of the effectiveness of their approach have occurred in studies with athletes. Aherne, Moran, and Lonsdale (2011) administered a MAC-based approach to university athletes from various sports and also included a no-treatment control group. In that study, high effect sizes of $d = 1.66$ were reported on the Flow State Scale (Jackson & Marsh, 1996) by those receiving the MAC-based intervention. Another study conducted with weightlifters at a Division I university using a MAC-based intervention and control group utilized the Penn State Worry Questionnaire (Meyer, Miller, Metzger & Borkovec, 1990) and obtained a similarly high effect size ($d = 1.2$-2.0; Gardner & Moore, 2004).

The Present Study

While empirical support exists for the use of a MAC-based approach to improve athletic performance, no research exists to support the application of MAC-based interventions in other areas where performance anxiety occurs, specifically MPA. Further, no studies to date have included a direct comparison between CB and MAC-based interventions with test anxiety, and even more specifically, MPA. The present study is designed to provide a direct comparison of CB-based and MAC-based interventions focused on examination and performance anxiety in a music context.

An important feature of the present study is the inclusion of dependent measures that assess three different areas, or realms, of human experience that can be impacted by classroom-based interventions. First, *knowledge* was assessed through multiple-choice quizzes to determine

if the basic elements of the theory and concepts presented during the CB-based and MAC-based

interventions were received, processed, and retained. Second, with an awareness that some

people may hold negative attitudes toward, and/or have reservations about, the integrity of

MAC-based or CB-based theory and skills, and that such attitudes alone could influence the

degree to which a person would be open to learning or utilizing strategies derived from these

theoretical orientations, *attitudes* toward CB and MAC theory were assessed through the

inclusion of previously established, and psychometrically sound, questionnaires. Third, given the

scientific emphasis on assessing outcome variables that can be measured objectively, *behavior*,

in the form of performance on a written examination and audio performance test, was recorded.

Hypotheses

Consistent with previously discussed research that supports CB-based interventions in the

reduction of performance anxiety (e.g., Clark & Argas, 1991), it was predicted that students

receiving the CB-based intervention would demonstrate a greater change than students receiving

either the MAC-based intervention or the no-treatment control group, as measured by reduction

in self-reported anxiety from midterm to final examination. Furthermore, it was predicted that

students receiving the CB-based intervention would demonstrate a greater change than students

receiving either the MAC-based intervention or no-treatment control group as measured by

improvement in the students' written examination and audio performance from midterm to final

examination. Finally, based on the limited research available for MAC-based interventions in

performance anxiety (e.g., Gardner & Moore, 2004), it was predicted that participants in the

MAC-based intervention would experience a reduction of self-reported anxiety, and would also

show greater improvement in their written examination and audio performance from midterm to

final examination, as compared to members of the no-treatment control group.

Method

Participants

The data was collected from Washburn University students enrolled in the Movies and

Music course (MU104). No one declined to participate in the study. Of the 104 total participants,

67 participants completed the study in its entirety, including attendance at all intervention

sessions and completion of all pre- and post-test measures, for an overall completion rate of

64%.

Of the 40 possible CB-based intervention participants, 21 completed the intervention in

its entirety, a completion rate of 53%. Of the CB-based intervention participants, 2 participants

did not complete the pre-test assessment, 15 participants did not complete the post-test

assessment, 1 participant did not complete the pre- and post-test assessments in their entirety,

and 1 participant did not take the final exam. All participants who completed the pre- and post-

test assessment also attended the CB-based intervention lecture between pre- and post-test

administrations. Of the CB-based intervention participants, 2 participants reported they never

practiced the intervention outside of class (9.5%), 11 reported they practiced the intervention 1-2

times outside of class (52.4%), 6 participants reported they practiced the intervention 3-4 times

outside of class (28.6), 1 participant reported they practiced the intervention 5-6 times outside of

class (4.8%), and 1 participant reported they practiced the intervention 7 or more times outside of

class (4.8%). See Figure 1 for the CB-based intervention participants' frequency of practice in

specific areas (e.g., final examination, athletic performance, work environment, personal

relationships, everyday life, other areas not listed) outside of class.

Of the 26 possible MAC-based intervention participants, 17 completed the intervention in

its entirety, a completion rate of 65%. Of the MAC-based intervention participants, 5 participants

did not complete the pre-test assessment, 3 participants did not complete the post-test

assessment, and 1 participant did not complete the pre-test assessment in its entirety. All

participants who completed the pre- and post-test assessment attended the MAC-based lecture

between pre- and post-test administrations. Of the MAC-based intervention participants, 3

participants reported they never practiced the intervention outside of class (17.6%), 7 participants

reported they practiced the intervention 1-2 times outside of class (41.2%), 5 participants

reported they practiced the intervention 3-4 times outside of class (29.4%), 2 participants

reported they practiced the intervention 5-6 times outside of class (11.8%), and 0 participants

reported they practiced the intervention 7 or more times outside of class (0%). See Figure 2 for

the MAC-based intervention participants' frequency of practice in specific areas (e.g., final

examination, athletic performance, work environment, personal relationships, everyday life,

other areas not listed) outside of class.

Of the 38 possible participants in the no-treatment control condition, 29 completed the

study in its entirety, a completion rate of 76%. Of the no-treatment control condition participants,

1 participant did not complete the pre-test assessment, 5 participants did not complete the post-

test assessment, 1 participant did not complete the pre-test assessment in its entirety, and 2

participants did not complete the post-test assessment in its entirety.

Across all three groups, the participants in the present study self-designated their gender

as 39 females (58.2%), 27 males (40.3), and 1 other (1.5%). The group contained 40 participants

who were 20 years or younger (59.7%), 24 participants between the ages of 21-30 years old

(35.8%), 1 participant between 31-40 (1.5%), and 2 participants between 41-50 years old (3%).

In regards to Race/Ethnicity, 56 participants identified as Caucasian (83.5%), 4 identified as

African American (6%), 3 identified as Latino (4.5%), 1 identified as Native American (1.5%),

and 3 identified as Other (4.5%).

Measures

       Demographic questionnaire. Participants were asked to provide demographic

information on their sex, age, and ethnicity. The complete demographic questionnaire can be

found in Appendix A.

       Cognitive Behavioral (CB) Knowledge Quiz. The CB Knowledge Quiz was developed

by the experimenters to assess participants' comprehension of the information about CB-based

interventions and key components as presented in the in-class lectures. The role this knowledge-

based measure played in the research design was threefold. First, because random assignment to

conditions was not possible in this study, comparisons of pre-intervention scores across the three

course sections were used to identify the presence of pre-existing differences in knowledge of

CB theory and concepts across sections. Second, comparisons of pre- versus post-intervention

test scores were used to assess the potency of the CB-based intervention; with this comparison

being used to test the hypothesis that students receiving the CB-based classroom presentations

would report increased knowledge of CB theory and concepts. Third, pre- to post-intervention

comparisons of scores on this measure were used to test the hypothesis that knowledge of CB

theory and concepts had been acquired at differential rates across the three course sections, with

students who received the CB-based intervention expected to show greater increases in

knowledge of CB theory and concepts compared to students included in the no-treatment control

and MAC-based intervention.

      All questions on the CB Knowledge Quiz were derived directly from the content

included in the PowerPoint presentation used during the two in-class lectures that served as the

CB-based intervention. The questions created by the experimenters were consistent with classroom-based assessment and were previewed and reviewed by the graduate students who conducted the in-class lectures to ensure that the content covered by the quiz questions had been presented in class. The CB Knowledge Quiz consisted of 10 multiple choice or true false questions, and was scored by assigning one point per correct answer. The potential obtained scores ranged from 0 to 10, with higher scores suggesting higher knowledge of CB-based principles. The complete CB Knowledge Quiz can be found in Appendix B.

Mindfulness, Acceptance, and Commitment (MAC) Knowledge Quiz. The MAC Knowledge Quiz was developed by the experimenters to assess participants' comprehension of the information about MAC-based interventions and key components as presented in the in-class lectures. The role this knowledge-based measure played in the research design was threefold. First, because random assignment to conditions was not possible in this study, comparisons of pre-intervention scores across the three course sections were used to identify the presence of pre-existing differences in knowledge of MAC theory and concepts across sections. Second, comparisons of pre- versus post-intervention test scores were used to assess the potency of the MAC-based intervention; with this comparison being used to test the hypothesis that students receiving the MAC-based classroom presentations would report increased knowledge of MAC theory and concepts. Third, pre- to post-intervention comparisons of scores on this measure were used to test the hypothesis that knowledge of MAC theory and concepts had been acquired at differential rates across the three course sections, with students in the MAC-based intervention expected to show greater increases in knowledge of MAC theory and concepts compared to students included in the no-treatment control and CB-based intervention.

All questions on the MAC Knowledge Quiz were derived directly from the content

included in the PowerPoint presentation used during the two in-class lectures. The questions

were consistent with classroom-based assessment and were previewed and reviewed by the

graduate students who conducted the in-class lecture to ensure that the content covered by the

quiz questions had been presented in class. The MAC Knowledge Quiz consisted of 10 multiple

choice or true false questions, and was scored by assigning one point for each correct answer.

The obtained scores had a potential range from 0 to 10, with higher scores suggesting higher

knowledge of MAC-based principles. The complete MAC Knowledge Quiz can be found in

Appendix C.

Emotion Regulation Questionnaire-9 (ERQ-9). The ERQ-9 was developed by Gross

and John (2003) to measure the participants' natural or innate level of emotion regulation

through either cognitive restructuring or expressive suppression. Expressive suppression is an

emotion regulation strategy characterized by effortful control of facial affect and other automatic

emotional responses, such as laughter or crying (Franchow & Suchy, 2015; Gross, 1998). The

role this attitude-based measure played in the research design was threefold. First, because

random assignment to conditions was not possible in this study, comparisons of pre-intervention

scores across the three course sections were used to identify the presence of pre-existing

differences in the utilization of emotion-regulation strategies (which are a form of coping

strategy closely aligned with the CB-based approach) and natural cognitive awareness across

sections. Second, comparisons of pre- versus post-intervention test scores were used to assess the

potency of the CB-based intervention; with this comparison being used to test the hypothesis that

students receiving the CB-based classroom presentations would report increased integration of

CB-based emotion regulation strategies into their daily routines and increased natural cognitive

awareness. Third, pre- to post-intervention comparisons of scores on this measure were used to test the hypothesis that attitudes toward or endorsement of CB-based emotion regulation strategies and natural cognitive awareness had been acquired at differential rates across the three course sections, with students who received the CB-based intervention expected to show greater increases in the utilization of CB-based emotion regulation strategies and natural cognitive awareness compared to students included in the no-treatment control and MAC-based intervention.

The self-report ERQ-9 measure consists of ten items, and example items include: "I control my emotions by changing the way I think about the situation I am in" and "I control my emotions by not expressing them." The participants are provided with a 7-point Likert scale ranging from 1, indicating "strongly disagree" to 7, indicating "strongly agree," and are asked to provide a rating for all 10 items. A total scale score is derived by summing the responses across all 10 items, producing a range of scores from 10 to 70, with higher scores representing stronger endorsement of the use of emotional regulation strategies.

Gross and John (2003) have reported strong psychometric properties for the ERQ-9. Internal consistency for the overall scale has been reported as ranging between $\alpha = .75$-$.82$ and $\alpha = .79$, and $\alpha = .73$ for the Reappraisal and Suppression subscale, respectively. The test re-test reliability has been reported as moderate across both subscales over a period of 3 months at $r = .69$. The ERQ-9 displayed moderate convergent validity ($r = .43$, $p < .05$) with the COPE Inventory Scale (Carver, Scheier, & Weintraub, 1989). When discriminant validity was tested by correlating the ERQ-9 total scale with the Revised Neuroticism-Extraversion-Openness Personality Inventory (Costa, & McCrae, 1992), very small positive correlations were found with four of the "Big 5" personality traits: Extraversion ($r = .11$, $p < .05$), Openness ($r = .15$, $p < .05$),

Agreeableness *(r = .14*, p < .05), and Conscientiousness *(r = .13*, p < .05). A negative correlation

was found with Neuroticism *(r = -.20, p < .05)*. The complete ERQ-9 can be found in Appendix

D.

   Mindful Attention Awareness Scale (MAAS). The MAAS was developed by Brown

and Ryan (2003) to assess mindfulness as a personality trait or characteristic, under the

assumption that some people are naturally more or less mindful than others. The role this

attitude-based measure played in the research design was threefold. First, because random

assignment to conditions was not possible in this study, comparisons of pre-intervention scores

across the three course sections were used to identify the presence of pre-existing differences

across sections in regard to how "mindful" participants were prior to participating in this

research. Second, comparisons of pre- versus post-intervention test scores were used to assess

the potency of the MAC-based intervention; with this comparison being used to test the

hypothesis that students receiving the MAC-based classroom presentations would report

increased levels of mindfulness within their daily routines. Third, pre- to post-intervention

comparisons of scores on this measure were used to test the hypothesis that attitudes toward or

endorsement of mindfulness had been acquired at differential rates across the three course

sections, with students who received the MAC-based intervention expected to show greater

increases in mindfulness compared to students included in the no-treatment control and CB-

based intervention.

  Examples of items from the MAAS include "I snack without being aware that I'm eating"

and "I rush through activities without being really attentive to them." The measure contains 15

items that are each rated on a 6-point Likert scale ranging from 1, indicating "almost always" to

6, indicating "almost never." Total scale scores are computed by summing responses across the

15 items and dividing by 15 to find the average, which results in scores ranging from 1 to 6.

Higher scores suggest higher levels of innate or trait mindfulness. Brown and Ryan (2003)

reported strong internal consistency (α = .87) for the MAAS. According to Baer, Smith,

Hopkins, Krietemeyer, and Toney (2006), efforts to document the convergent validity of the

MAAS with other mindfulness inventories have produced only moderate correlations.

Specifically, researchers have reported identical moderate positive correlations (r = .51, p < .01)

between the MAAS and both the Kentucky Inventory of Mindfulness Skills (Baer, Smith, &

Allen, 2004); and the Cognitive Affective Mindfulness Scale (Feldman, Hayes, Kumar, Greeson,

& Laurenceau, 2007). These correlations suggest that the MAAS may be describing somewhat

unique aspects of mindfulness, such as the subjects' mindfulness in everyday tasks, as evidenced

by statements such as "I tend to walk quickly to where I'm going without paying attention to

what I experience along the way." Brown and Ryan (2003) found support for discriminant

validity when correlations of r = -.40 (p < .0001) and r = -.41 (p < .0001) were obtained in

comparisons between the MAAS scale and the State Trait Anxiety Inventory (Spielberger,

Gorsuch, Lushene, Vagg, & Jacobs, 1983) and the Beck Depression Inventory, respectively. The

complete MAAS can be found in Appendix E.

Test Anxiety Inventory (TAI). The TAI was developed by Spielberger et al. (1980), and

was designed for high school and college students as a self-report measure of the presence of test

anxiety. The role this measure played in the research design was threefold. First, because random

assignment to conditions was not possible in this study, comparisons of pre-intervention scores

across the three course sections were used to identify the presence of pre-existing differences

across sections in the level of anxiety experienced by participants prior to their involvement in

this study. Second, comparisons of pre- versus post-intervention test scores were used to assess

the potency of both the CB and MAC-based interventions, with this comparison being used to test the hypothesis that students receiving either form of classroom presentation would report decreased levels of anxiety. Third, pre- to post-intervention comparisons of scores on this measure were used to determine if changes in anxiety occurred at differential rates across the three course sections.

The TAI consists of 20 items such as "I feel confident and relaxed while taking tests" and "During tests I feel very tense." Participants are asked to rank their anxiety and specific symptoms using a 4-point Likert-type scale ranging from 1, indicating "almost never" to 4, indicating "almost always." Total scale scores are computed by summing the responses across the 20 items, producing scores in the range of 20 to 80. Higher scores suggest greater levels of anxiety experienced. Spielberger et al. (1980) have reported strong psychometric properties for the TAI. Internal consistency has been established with Cronbach's alpha between .92 and .96. Test-retest reliability has been reported as $r = .80$ at two weeks, and $r = .62$ at six months. These authors also demonstrated good convergent validity in both males ($r = .82$) and females ($r = .83$) when the TAI was compared to the Test Anxiety Scale (Sarason, 1978) and good discriminant validity through documented negative correlations with study skills for both males ($r = -.51$) and females ($r = -.30$). The complete TAI can be found in Appendix F.

Follow-up questionnaire. Participants were asked to provide information on their attendance, practice, and personal application of the materials presented. The complete follow-up questionnaire can be found in Appendix K.

Movies and Music (MU104) written examination and audio performance scores. The participants in the current study were students enrolled in a Movies and Music course (MU104). The course included a midterm and final written examination and audio performance, consisting

of five soundtrack audio examples. Participants were asked to provide specific permission for the

experimenter to access their written examination and audio performance scores from their

midterm and final examinations in the MU104 course. All students were informed they had the

right to decline the sharing of this information. The wording used to clarify this request is

detailed in the Informed Consent form (see Appendix G and Appendix H) used in this study. The

participants' midterm and final examination consisted of a 50 multiple-choice question written

exam and an audio performance, consisting of five soundtrack audio examples. During the audio

performance participants were asked to identify the name, style, and emotion of the music, along

with the title of the movie the listening example was composed for. The audio performance and

written examination were scored as a percentage based on their overall response. The written

examination accounted for 80% of their final score and the audio performance accounted for

20%.

Procedures

The experimenters initiated contact with the chair of the Music Department at Washburn

University to gain permission to consult with the two faculty members assigned to teach the

three sections of the Movies and Music course (MU104) offered during the Spring 2015

semester. A series of email contacts, supplemented by one face-to-face meeting between the

experimenters and Music Department faculty produced a collaborative agreement that provided

the experimenters with access to the students enrolled in each of the three sections of the course.

The agreement between the Music Department faculty and the researchers included allowing the

members of the research team to access students in each section directly by providing a series of

three classroom presentations during scheduled class meeting times. The content of the three, 20

minute, in class presentations conducted by the researchers are described below.

The first classroom contact occurred one week before midterm examinations and lasted a total of 20 minutes. The researchers offered all students in attendance that day the opportunity to participate in the research study, with the understanding that bonus points toward the course grade could be earned by participating, which included attending class on all three occasions when the researchers were present, and completing the full set of questionnaires in its entirety at pre- and post-testing. Students were reassured that a decision to not participate would have no negative bearing on their overall grade in the MU104 course. After reviewing the Informed Consent form (see Appendix G and Appendix H) all students who documented their consent to participate with their signature on the form were asked to complete a packet of baseline questionnaires in the classroom immediately that same day. The packet of questionnaires administered during this pre-test baseline phase included the demographic questionnaire, the CB Knowledge Quiz, the MAC Knowledge Quiz, the ERQ-9, the MAAS, and the TAI.

The following week all participants took their midterm examination, which included a 50 multiple-choice question written exam, and an audio performance portion, consisting of five soundtrack audio examples. On the audio performance items, each student was asked to identify the name, style, and emotion of the music, along with the title of the movie the listening example was composed for. Students had a strong incentive to perform well on the audio performance items as they accounted for 20% of the midterm and final exam grade.

To create the two independent comparison treatment groups and the single no-treatment control group for this quasi-experimental research design, the assignment of the CB-based intervention, the MAC-based intervention, and the no-treatment control conditions were assigned at the level of the class sections. Due to logistical necessities of providing the interventions in a consistent and efficient manner, random assignment to conditions was not possible, and all

members of each class section were assigned to the same group. Also, as one course instructor was assigned to teach two of the three sections, and given that during the face-to-face meetings and email communications with the two course instructors, this first instructor appeared to be more cooperative and reliable with the requirements of the research design, the researchers determined that the two sections taught by the same instructor would serve as the MAC-based and CB-based treatment conditions, with the single section taught by the second instructor serving as the no-treatment control condition.

Cognitive behavioral intervention. Participants in the CB-based intervention received two 20-minute PowerPoint informational lectures that described the fundamental theoretical principles and concepts of CB-based interventions, and also included more applied information about cognitive tools and techniques related to performance-test anxiety reduction. A graduate research assistant, who had been trained in how to present the intervention in a classroom setting, conducted the presentation. The first instructional session of the intervention occurred two weeks prior to the final examination. The second instructional session occurred one week prior to the final examination. The second instructional session, which was the third, and final, contact in the classroom between the researchers and study participants, also included administration of the post-test measures. Post-test assessment included all five questionnaires administered at pre-testing that served as dependent measures (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, and TAI). In addition, a follow-up questionnaire (see Appendix K) was administered in order to determine each student's attendance, practice, and personal application of the materials presented.

The procedures and information covered during each in class session are described in the following paragraphs.

Session 1: Cognitive behavioral group.

Introduction (2 minutes). In session one, the graduate research assistant began with a brief description of how performance-test anxiety can affect performance within the classroom and in other contexts. The presenter defined cognitive behavioral techniques, with specific and repeated emphasis placed on the primacy of first identifying, and then actively and intentionally modifying, maladaptive thoughts as the foundation for reducing performance anxiety.

Levels of thought (5 minutes). The research assistant defined automatic thoughts, intermediate beliefs, and core beliefs. They described automatic thoughts as the easiest thoughts to change and emphasized their often-unconscious occurrence and potential to influence performances and examinations. The researcher then described intermediate beliefs and core beliefs as more difficult to change, noting that intermediate thoughts are often based around societal rules or standards, and core beliefs often reflect one's more personal belief system. The researcher then encouraged students to focus on using interventions targeting their automatic thoughts when attempting to reduce examination-performance anxiety to improve their audio performance.

Cognitive distortions (5 minutes). The research assistant defined cognitive distortions as exaggerated or irrational thought patterns that may occur without conscious awareness. The researcher then provided participants with a handout describing the most common cognitive distortion (see Appendix I). Several cognitive distortions were discussed in greater detail, describing characteristics of each and offering example statements that illustrate the cognitive distortions described. The cognitive distortions discussed were: all-or-nothing thinking, overgeneralization, disqualifying the positive, should statements, labeling, emotional reasoning, mind reading, fortune telling, and magnification.

S.T.E.B. chart (6 minutes). The research assistant explained the acronym S.T.E.B. by noting the S stands for "situation," T stands for "thought," E stands for "emotion," and B stands for "Behavior." How these four elements interact, and the impact the S→T→E→B sequence can have on their audio performance, was emphasized. The presenter highlighted the role thoughts play as the vehicle for change, emphasizing thoughts as the only element within the S.T.E.B. model the participant has direct control over. The presenter then engaged in an illustrative and applied example by completing the "top half" of a S.T.E.B. chart using a hypothetical problematic situation. Study participants were then asked to contribute to a discussion that first identified and labeled the specific cognitive distortion illustrated by the example, and then brainstormed what a more constructive statement would be. Once more constructive statements had been developed, the presenter filled out the "bottom half" of the S.T.E.B. chart by eliciting input from the students and hypothesizing the potential change that engaging in more adaptive and useful thoughts would have on the emotions experienced, and the eventual behavior. The instructional portion of the first in class lecture concluded with the participants being asked to fill out a personal S.T.E.B. chart focused on the situation of the audio performance component of the final exam in the MU104 course. The presenter emphasized that the S.T.E.B. chart (see Appendix J) each student created was confidential, would not be turned into the researcher or course instructor, and was theirs to keep as a reference and study tool.

Review (2 minutes). The research assistant reviewed the definition and foundation of CB-based interventions, levels of thought, cognitive distortions, and the S.T.E.B. chart. Participants were asked to fill out the rest of their S.T.E.B. document on their own outside of class. The research assistant ended the first session by asking for additional questions.

Session 2: Cognitive behavioral group.

Introduction (2 minutes). In session two, the graduate research assistant started the

session by reviewing the material covered in session one. The information reviewed entailed:

general principles of CB-based interventions, the three levels of thoughts, cognitive distortions,

and the S.T.E.B. chart.

Fallacies (5 minutes). The research assistant introduced the fallacies as a continuation of

cognitive distortions noting that these fallacies could be utilized to bring awareness to the

participants' thoughts. The discussion of each fallacy contained the characteristics associated

with that fallacy and an example statement that exemplified the fallacy described. Each

participant was provided with a handout describing each fallacy in detail (see Appendix I). The

fallacies discussed included: control, change, worry, ignoring, fairness, and attachment.

S.T.E.B. chart (10 minutes). The participants and research assistant engaged in a

collaborative discussion centered on completing a hypothetical S.T.E.B. chart utilizing both

cognitive distortions and fallacies to label the non-constructive thoughts. The assistant and

participants worked together to brainstorm more constructive thoughts in order to reach a more

favorable emotion and behavior. The participants were asked to fill out additional S.T.E.B. charts

pertaining to their personal difficulties and individual thoughts related to test-taking, with

specific emphasis on the audio performance portion of the final exam in the MU104 class.

Participants completed this practice exercise using a S.T.E.B. chart (see Appendix J) provided by

the presenter. Participants were encouraged to fill out numerous charts during this allotted time.

Review (3 minutes). The presenter then reviewed the material covered across both

sections; reminding the participants that they have the ability to modify their thoughts, and the

direct effect such modifications can have on their performance. The session concluded with the

assistant administering the post-test measures. Post-test assessment included five questionnaires (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, and TAI). In addition, a follow-up questionnaire (see Appendix K) was administered in order to determine each student's attendance, practice, and personal application of the materials presented. The assistant asked for additional questions and provided the contact information of the principal researcher. Participants were instructed to contact the principal researcher with any follow-up questions, to obtain the results of the study, or to seek additional information.

Mindfulness, acceptance, and commitment intervention. Participants in the MAC-based intervention received two 20-minute PowerPoint informational lectures over optimal arousal, diaphragmatic breathing, and mindfulness techniques related to performance-test anxiety reduction. A different graduate research assistant, who had been trained in how to present the intervention described below in a classroom setting, conducted the presentation. The first instructional session of the intervention occurred two weeks prior to the final examination. The second instructional session occurred one week prior to the final examination. The second instructional session, which was the third, and final, contact in the classroom between the researchers and study participants, also included administration of the post-test measures. Post-test assessment included all five questionnaires administered at pre-testing that served as dependent measures (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, and TAI). In addition, a follow-up questionnaire (see Appendix K) was administered in order to determine each student's attendance, practice, and personal application of the materials presented.

Session 1: Mindfulness, acceptance, and commitment group.

Introduction (3 minutes). In session one the graduate research assistant started the session with a brief description of how performance-test anxiety can affect performance within the

classroom and in other contexts. The assistant defined mindfulness by focusing on awareness of

internal-external experiences, while emphasizing the acceptance of thoughts as the most critical

element. The presenter then noted that mindfulness developed from Buddhism and has a long

history of being used to manage stress and anxiety in non-clinical settings.

      Breathing (2 minutes). The presenter discussed the importance of breathing and the effect

it can have on our psychological wellbeing and awareness of internal-external experiences.

Participants were asked to become comfortable in their chair, relax their body, let the shoulders

drop, jaw relax, and let their arms and legs rest comfortably. Participants were then asked to

focus their eyes on an object or close them in order to draw attention to their breathing.

Participants were asked to place one hand on their chest and one hand on their abdomen. The

research assistant instructed the participants to bring their breath into their abdomen while

leaving the body relaxed. During this time the presenter emphasized acceptance of all thoughts.

They emphasized that each participant should focus on their breath, but acknowledge and accept

any other thoughts that may intrude upon their focus. The participants were instructed to accept

these thoughts and allow them to pass through their mind before returning their focus to

breathing.

      Optimal arousal (2 minutes). The assistant explained that optimal performance occurs

most often when we are moderately, or only somewhat aroused, meaning that performance is

normally hindered when individuals are under-stimulated or over-stimulated. The assistant noted

that the breathing techniques previously learned could help mediate arousal during times of

performance.

      Mindfulness of external world (5 minutes). Each participant was asked to focus on each

of the five senses (sight, touch, taste, smell, hear) individually. For example, the research

assistant asked the participants to notice an object in the room they have never seen before. This brought awareness to the participants' sight. After bringing awareness through similar exercises for each of the five senses, the assistant noted that during each experience the participants were never asked to formulate an opinion of the sight, touch, taste, smell, and hearing experiences. The researcher emphasized that while all experiences were noticed, all sensations/experiences passed, and none were judged or evaluated as positive or negative—they simply existed.

Mindfulness of thoughts (5 minutes). The presenter then used the prepared example of "the world is flat" to demonstrate that not all thoughts, even those that are widely endorsed and with strong social consensus, are necessarily "true" or "facts." The research assistant defined beliefs as thoughts that have occurred numerous times, and have therefore been engrained as deeply rooted truths via their mere repetition. The assistant noted that thoughts regularly lead to beliefs, which then often lead to assumption that these beliefs are facts. The presenter then discussed meta-cognition and how thinking about our thoughts allows us to move away from seeing potential falsehoods as facts. The participants were asked to focus on their thoughts while breathing deeply and rhythmically, closing their eyes if comfortable, and were instructed to allow their thoughts to pass. The presenter reminded the participants that all thoughts should pass like a leaf in a stream; they are not facts or beliefs, simply thoughts.

Review (3 minutes). The assistant then discussed the utilization of all of the tools as a sequence. The assistant worked through breathing, optimal arousal, mindfulness of the external world, and then mindfulness of thoughts, as a sequence that can be accomplished quite rapidly when well practiced. The research assistant ended the session by asking for additional questions.

Session 2: Mindfulness, acceptance, and commitment group.

Introduction (5 minutes). In session two, the presenter started the session by reviewing the material covered in session one. The information reviewed contained: definition of mindfulness, origin of mindfulness, breathing, optimal arousal, mindfulness of external world, and mindfulness of thoughts.

Mindfulness of difficult thoughts (10 minutes). Participants were reminded that not all thoughts are facts and that thoughts are simply what the mind is saying or creating at any given moment. The presenter then instructed the participants to get into a comfortable position, utilize deep abdomen breathing, and close their eyes. They were asked to think of a difficult situation, and were encouraged to select their upcoming written examination and audio performance on their final exam. The participants were asked to sit with any difficult or troubling thoughts this situation might produce, and then merely notice how their body reacts. They were not asked to modify their sensations or thoughts, simply to notice them and let them pass. The participants were then asked to transfer the attention back and forth between their sensations and thoughts. The presenter asked the participants to privately label any sensations they may be experiencing on their own, and once again allow them to pass. The participants were asked to transfer the attention back and forth between their sensations and thoughts. Finally, the participants were asked to focus on their breath and open their eyes.

Review (5 minutes). The presenter reviewed the material covered across both sessions, reminding the participants that the acceptance of their experiences and thoughts is the essential element in improving performance. The assistant also administered the post-test measures. Post-test assessment included five questionnaires (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, and TAI). In addition, a follow-up questionnaire (see Appendix K) was

administered in order to determine each student's attendance, practice, and personal application

of the materials presented. The assistant asked for additional questions and provided the contact

information of the principal researcher. Participants were instructed to contact the principal

researcher with any follow-up questions, to obtain the results of the study, or to seek additional

information.

No-treatment control group. The no-treatment control group received no form of

intervention or additional instruction. The researcher visited the classroom on two occasions.

One week prior to the midterm examination (the same point in the semester when the first

classroom contact occurred with the two intervention classrooms), participants had the informed

consent form explained to them. Those who agreed to participate were administered the packet

of baseline questionnaires. One week prior to the final examination in the MU104 course (again,

the same point in the semester when the final classroom contact occurred with the two

intervention classrooms), the post-test measures were administered. Due to the lack of

intervention provided, participants in the no-treatment control group had no attendance, practice,

or personal application of skills to report. Therefore, no follow-up questionnaire was

administered.

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Results

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Bivariate correlations among the seven pre-test scores (see Table 1) were examined to

determine appropriate statistical analyses. The correlations conducted on the seven pre-test

measures revealed significant but small[3] correlations between the CB Knowledge Quiz and

midterm audio performance, MAC Knowledge Quiz and midterm audio performance, MAAS

and TAI, written examination and audio performance, and the MAC Knowledge Quiz and

written examination. No other correlations were significant.

Figure 3 provides the full set of means for each of the pre-test variables (CBT Knowledge

Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, TAI, audio performance, written examination)

grouped by independent variables (CB-based intervention, MAC-based intervention, and no

treatment control). To assess pre-existing differences between conditions in the levels of

knowledge of CB and MAC theory and concepts, attitudes toward CB and MAC orientations,

innate levels of anxiety, written examination scores, and audio performance scores, a series of

univariate analyses of variance (ANOVAs) were conducted using pre-test scores as the

dependent variables.

The only significant pre-existing difference between the CB-based intervention, MAC-

based intervention, and no-treatment control group identified from the comparisons of pre-test

scores across the seven dependent variables occurred on the pre-audio performance scores

$F(2,64) = 3.436$, $p = .04$. Post hoc examinations of pairwise comparisons using Bonferroni

corrections found that the CB-based intervention ($M = 86.67$, $SE = 4.71$) had significantly higher

($p = .03$) pre-test audio performance scores compared to the no-treatment control group ($M =$

70.52, $SE = 4.01$). No other differences were significant (ps = .12 to .89). This difference was

controlled for in subsequent hypothesis tests.

Bivariate correlations among the key dependent variables—changes in scores from pre-

to post-tests— were examined to determine appropriate statistical analyses (see Table 2). The

correlations conducted on the change scores from pre- to post-tests of the seven dependent

variables revealed significant, but small, correlations between the CB Knowledge Quiz and

MAC Knowledge Quiz scores. No other differences were significant.

After visually inspecting the data for outliers affecting assumptions of normalcy, the data

set was winsorized (i.e., replaced with adjacent values from the remaining data; Barnett & Lewis,

1994) by modifying the pre- to post-test difference values falling more than 1.5 times the interquartile range prior to analyses (see Table 3) to alleviate the danger of bias by "retaining an attenuated version of the datum" (Ghosh & Vogt, 2012, p. 3,456). See Figure 4 for the means of each of the pre- to post-test difference scores on the dependent variables (CBT Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, TAI, audio performance, written examination) grouped by independent variables (CB-based intervention, MAC-based intervention, and no treatment control).

To assess the effectiveness of the interventions in improving participants' knowledge of CB and MAC theories and concepts, two analyses of covariance (ANCOVAs) were conducted using the changes in scores on the CB Knowledge Quiz and MAC Knowledge Quiz from pre- to post-testing as the dependent variables, controlling for the difference between groups on the pre-audio performance scores.

The hypothesis that students who received the CB-based intervention would demonstrate greater increases in knowledge of CB theory and concepts compared to students included in the MAC-based intervention and no-treatment control was fully supported. Results revealed a significant effect on the participants' knowledge of CB theory and skills measured by the CB Knowledge Quiz, $F(2, 67) = 15.41$, $p < .001$. Post hoc examinations of pairwise comparisons using Bonferroni corrections found that the pre- to post-test difference scores for the CB-based intervention were higher than the MAC-based intervention and the no-treatment control group, with the CB-based intervention obtaining a higher mean difference score ($M = 2.85$, $SE = 0.42$) than the MAC-based intervention mean difference score ($M = 0.56$, $SE = 0.45$) and the no-treatment control group mean difference score ($M = -0.22$, $SE = 0.36$).

The hypothesis that students who received the MAC-based intervention would demonstrate greater increases in knowledge of MAC theory and concepts compared to students included in the CB-based intervention and no-treatment control was partially supported. Results revealed a significant effect on the participants' knowledge of MAC theory and concepts measured by the MAC Knowledge Quiz, $F(2, 67) = 3.48$, $p = .04$. Post hoc examinations of pairwise comparisons using Bonferroni corrections found that the pre- to post-test difference scores for the MAC-based intervention were significantly higher than the no treatment control group, with the MAC-based intervention obtaining a higher mean difference score ($M = 1.00$, $SE = 0.57$) than the no-treatment control mean difference score ($M = -0.89$, $SE = 0.44$). The difference in pre- to post-test changes in participants' knowledge of MAC theory and concepts between the CB and MAC-based interventions was not significant ($p = .79$). Though not at the significant level, the CB-based intervention mean difference score revealed patterns consistent with the hypotheses ($M = 0.13$, $SE = 0.52$).

To assess the effectiveness of the interventions in altering participants' attitudes toward or endorsement of CB and MAC principles, two ANCOVAs were conducted using the changes in scores on the ERQ-9 and MAAS from pre- to post-testing as the dependent variables, controlling for the difference between groups on the pre-audio performance scores.

The hypothesis that students who received the CB-based intervention would demonstrate greater increases in the utilization of CB-based emotion regulation strategies and natural cognitive awareness compared to students included in the no-treatment control and MAC-based intervention was not supported. There was not a significant effect across conditions on the participants' natural cognitive awareness or utilization of CB-based emotion regulation strategies as measured by the ERQ-9, $F(2, 64) = 1.65$, $p = .20$. Even though the ANCOVA on participants'

natural cognitive awareness and CB-based emotion regulation strategies did not reach the level

of statistical significance, closer examination of the difference score means across the three

conditions reveals patterns consistent with the hypotheses. The mean difference scores on the

ERQ-9 for the CB-based intervention were higher than the MAC-based intervention and the no-

treatment control group, with the CB-intervention obtaining a higher mean difference score ($M =$

0.48, $SD = 7.74$) than the MAC-based intervention mean difference score ($M = -1.24$, $SD = 8.31$)

and the no-treatment control mean difference score ($M = -3.62$, $SD = 7.31$).

The hypothesis that students who received the MAC-based intervention would

demonstrate greater increases in natural mindfulness compared to students included in the no-

treatment control and CB-based intervention was not supported. There was not a significant

effect across conditions on the participants' natural mindfulness measured by the MAAS, $F(2,$

$64) = 0.37$, $p = .70$. Even though the ANCOVA on the participants' natural mindfulness did not

reach the level of statistical significance, closer examination of the difference score means across

the three conditions reveals patterns consistent with the hypotheses. The mean difference scores

on the MAAS for the MAC-based intervention were higher than the CB-based intervention and

the no-treatment control group, with the MAC-based intervention obtaining a higher mean

difference score ($M = 0.02$, $SD = 0.47$) than the CB-based intervention mean difference score (M

$= -0.09$, $SD = 0.72$) and the no-treatment control mean difference score ($M = -0.03$, $SD = 0.60$).

To assess the directly stated hypothesis regarding the reduction of endorsed anxiety

symptoms, an ANCOVA was conducted using the changes in scores on the TAI from pre- to

post-testing as the dependent variable, controlling for the difference between groups on the pre-

audio performance scores.

The main hypothesis, that the CB-based intervention would demonstrate greater reductions in anxiety compared to both the MAC-based intervention and no-treatment control group, was not supported. Results indicate no significant differences across the three conditions, $F(2, 64) = 2.13$, $p = .13$. Even though the ANCOVA on the participants' anxiety did not reach the level of statistical significance, closer examination of the difference score means across the three conditions reveals patterns consistent with the hypotheses. The mean difference scores on the TAI for the CB and MAC-based interventions were higher than the no-treatment control group, with the CB-based intervention obtaining a higher mean difference score ($M = -7.67$, $SD = 14.77$) than the MAC-based intervention mean difference score ($M = -2.47$, $SD = 6.08$) and the no-treatment control mean difference score ($M = -0.34$, $SD = 9.62$). It should be noted here that a negative mean difference score represents a reduction in anxiety symptoms from pre- to post-assessment.

Finally, to test the additional hypotheses of the differential effects of the CB-based intervention versus the MAC-based intervention on a final written examination and audio performance (which were not correlated, $r = .16$, $p = .19$), two ANCOVAs were conducted using changes in the students' written examination scores and audio performances from midterm to final exam as the dependent variables, controlling for the difference between groups on the pre-audio performance scores.

The behavior-based hypothesis that the CB-based intervention would demonstrate a greater change in difference scores than both the MAC-based and the no-treatment control group as measured by improvement in the students' written examination, was not supported. The ANCOVA result indicated no significant differences across the three conditions for the written examination score, $F(2, 64) = 2.62$, $p = .08$. Even though the ANCOVA on participants' written

examination did not reach the level of statistical significance, closer examination of the

difference score means across the three conditions reveals patterns consistent with the

hypotheses. The mean difference scores on the written examination for the CB and MAC-based

interventions were higher than the no-treatment control group, with the CB-based intervention

obtaining a higher mean difference score ($M = 6.81$, $SD = 8.50$) than the MAC-based

intervention mean difference score ($M = 5.53$, $SD = 11.91$) and the no-treatment control mean

difference score ($M = 1.45$, $SD = 8.96$).

The behavior-based hypothesis that the CB-based intervention would demonstrate a

greater change in difference scores than both MAC-based intervention and no-treatment control

group as measured by improvement in the students' audio performance was partially supported.

There was a significant effect across conditions on participants' audio performance, $F(2, 64) =$

11.04, $p < .001$. Post hoc examinations of pairwise comparisons using Bonferroni corrections

found that the pre- to post-test difference scores for the CB-based intervention ($M = 16.35$, $SE =$

3.25) showed a greater increase ($p = .001$) in audio performance change scores than the no-

treatment control group ($M = 0.28$, $SE = 2.76$). There was no significant difference between the

CB and MAC-based interventions on their audio performance change scores ($p = 1.00$).

The behavior-based hypothesis that the MAC-based intervention would demonstrate a

greater change in difference scores than the no-treatment control group as measured by the

improvement in the students' audio performance was supported. Post hoc examinations of

pairwise comparisons using Bonferroni corrections found that the pre- to post-test differences

scores for the MAC-based intervention ($M = 19.04$, $SE = 3.51$) showed greater increase ($p <$

.001) in audio performance change scores than the no-treatment control group ($M = 0.28$, $SE =$

2.76).

Discussion

The primary purpose of this study was to examine the effects of CB-based and MAC-based interventions on test and performance anxiety in a music context. It was predicted that the CB-based intervention would be more effective in reducing anxiety, and would thereby improve performance on both a traditional final written examination and an audio performance compared to a MAC-based intervention and no-treatment control condition. It was also predicted that a MAC-based intervention would be more effective than a no-treatment control condition on anxiety reduction and improved written examination and audio performance scores.

Perhaps due to the lack of random assignment to conditions, significant differences in pre-test scores were identified across the three conditions on one, but only one, dependent variable: audio performance scores. Further investigation noted that the main difference in audio performance scores was between the CB-based intervention and the no-treatment control group. The difference in audio performance scores may have been caused by the utilization of two different professors instructing the Movies and Music course. Therefore, the different scoring styles between these professors may have influenced the discrepancy in audio performance scores. However, the same instructor assigned to the course section that received the CB-based intervention was also assigned to the section that received the MAC-based intervention; and the pre-test audio performance scores for MAC-based intervention were not significantly different from the other two conditions.

Results suggest that both the CB-based and MAC-based interventions were effective in increasing participants' knowledge of CB and MAC theories and concepts as measured by the CB Knowledge Quiz and MAC Knowledge Quiz. These results indicate that the relatively minimal and non-intensive interventions, which consisted of two 20-minute in-class lectures that

included in-class application and practice of theory-specific skills, as well as encouragement to engage in additional individual practice outside of class, were sufficient to increase students' knowledge of CB and MAC theories and concepts.

In contrast to previous research (Roemer et al., 2008; Shapiro et al., 2007) there was not a significant effect on the participants' attitudes toward or endorsement of cognitive awareness or mindfulness as measured by the ERQ-9 and MAAS. The lack of change in attitudes toward or endorsement of cognitive awareness or mindfulness may be a reflection of the brevity of the interventions. While as noted above, the participants who received each intervention had learned the material needed to implement the interventions, perhaps the time allowed to implement and experience the potential benefits of utilizing the theory-specific skills was not sufficient to alter participants' mindset or attitudes toward CB or MAC theory and concepts.

The findings that no significant reductions in anxiety (measured by the TAI) were reported by participants who received the CB or MAC-based interventions are inconsistent with the clinical treatment literature where reductions in anxiety have been noted as the result of implementation of CB and MAC-based skills (Ergene, 2003; Jain et al., 2007; Shapiro et al., 2007; Weems et al, 2009; Yahav & Coven, 2008). Again, failure to demonstrate significant reductions in anxiety may be directly related to the limited time allotted to practicing the anxiety reduction techniques. The clinical literature suggests that successful utilization of CB or MAC-based skills takes practice and regular implementation—that these skills must be truly "mastered"—in order to experience noticeable reductions in anxiety (Bogels et al., 2006; Clark & Argas, 1991; Tillfors et al., 2008). It is also possible that the participants in this study differed from the clinical population in regards to the severity of the anxiety being experienced prior to receiving the intervention. In other words, reductions in anxiety in the current sample may have

been limited by a "floor effect" in that the pre-test anxiety scores did not leave much room for change. Further, while appropriate and necessary to accommodate the research design, the timing of the intervention may have detracted from the potency of the interventions, in that the two weeks prior to finals week may have been an extremely busy time for students, who may have been reluctant to "try something new" within their already hectic daily schedules. Therefore, previously formed habits may have been maintained due to conditioned stress reactivity. Finally, while participants were asked to self-report how often they had practiced the CB or MAC-based skills outside of class, the researchers were unable to verify the accuracy of these self-reports.

There was not a significant effect on the participants' written examination. The failure to significantly improve the participants written examination score is inconsistent with the previous literature (Ergene, 2003; Weems et al., 2009). The failure to identify significant improvements on the written examination may have been due to the application of the techniques to anxiety reduction on a multiple-choice question based written exam. The multiple choice questions provided on the written examination allowed the participants to choose the correct answer out of four possible choices. Perhaps the opportunity to select the correct answer from four possible choices caused students to select appropriate, yet incorrect responses, explaining the lack of significant score improvement.

The behavior-based hypothesis that the CB-based intervention would demonstrate a greater change in difference scores than both the MAC-based and no-treatment control group as measured by improvement in the students' audio performance was partially supported. The CB-based intervention demonstrated a significant increase in audio performance compared to the no-treatment control group. The significant increase in audio performance suggests that the CB-based intervention may have increased the participants' scores on the final audio performance

and may be an appropriate form of intervention for those suffering from MPA. In contrast, the

CB-based intervention failed to increase participants' scores on the written examination when

compared to both the MAC and no-treatment control group. The difference between score

improvement on the written examination and audio performance suggests the CB-based

intervention may be suitable within a music context and can be applied to MPA, specifically. In

contrast to the significant improvement in audio performance and inconsistent with the literature

(Ergene, 2003; Weems et al., 2009), these results suggest the CB-based intervention may not

improve performance in relation to other forms of performance anxiety, such as test anxiety.

There was no significant difference between the CB and MAC-based intervention on their audio

performance change scores. The failure to identify significant differences between the CB and

MAC-based interventions on their audio performance change scores may be due to the concise

yet strong presentation of both interventions.

The behavior-based hypothesis that the MAC-based intervention would demonstrate a

greater change in difference scores than the no-treatment control group as measured by the

improvement in the students' audio performance was supported. The improvement in audio

performance is consistent with the application of MAC-based interventions to athletic

performance (Aherne et al., 2011; Gardner & Moore, 2004). The MAC-based intervention

demonstrated a significant increase in audio performance compared to the no-treatment control

group. The significant improvement in audio performance change scores suggests that the MAC-

based intervention may have increased the participants' scores on the final audio performance

and may be an appropriate form of intervention for those suffering from MPA. In contrast, the

MAC-based intervention failed to increase participants' scores on the written exam when

compared to both the CB and no-treatment control group. The difference between score

improvement between written examination and audio performance suggests the MAC-based

intervention may be suitable within a music context and can be applied to MPA, specifically. In

contrast to the significant improvement in audio performance and inconsistent with the limited

literature (Jain et al., 2007; Shapiro et al., 2007), these results suggest the MAC-based

intervention may not improve performance in relation to other forms of performance anxiety,

such as test anxiety.

It can be concluded that both CB and MAC-based interventions may be an appropriate

form of intervention for those suffering from anxiety within a music context. Consistent with

previous research, results suggest both CB and MAC-based interventions are significantly better

than no-treatment (Aherne et al., 2011; Andrews et al., 2010; Clark & Argas, 1991; Gardner &

Moore, 2004; Robinson et al., 2010; Roemer et al., 2008; Titov et al., 2009). However, it cannot

be determined which intervention may be more successful in increasing audio performance. It

can be concluded that the CB and MAC-based interventions have a specific ability to improve

performance within a music context compared to a traditional written exam. It can also be

concluded that students had learned the CB and MAC-based skills, which is significantly

supported, and were able to apply the skills within the specific musical context based on self-

report, and significantly increase their audio performance scores. The significant increase in

audio performance scores is unexpected with non-significant reductions in anxiety. Due to the

brevity of time allotted between pre- and post-measures perhaps the lack of reduction in anxiety

symptoms is due to the needed repetition of practice in order to see significant anxiety reduction.

This is supported in previous literature, which shows a greater reduction in anxiety at post-

follow-up (Bogels et al., 2006; Clark & Argas, 1991; Tillfors et al., 2008) when compared to

immediate post-treatment. Perhaps students were able to reduce their anxiety, though not at a

significant level, which allowed them to perform better on their audio performance. In addition,

the student's anxiety levels may not have been at a clinical level of impairment and may have

had little room to improve or reduce at the significant level.

Limitations, Strengths, and Future Research

The study contained limitations that may have affected the outcomes of this research. For

example, two professors were utilized in order to assess numerous students and to allow for three

separate groups coinciding with CB, MAC, and no-treatment control groups respectively. While

utilizing two professors allowed for three groups and additional participants, it did not allow for

random assignment of participants to conditions. The participants were placed in the CB, MAC,

or no-treatment control group based on the class they enrolled in. The results suggest the

utilization of two professors did not cause differences in scoring across the three sections on the

written examination and audio performance. Specific to the direct comparison of the effects of

CB versus MAC-based interventions, participants in the treatment conditions were taught by the

same instructor, which reduces the likely impact of this potential confound. Future efforts to

replicate and improve upon the research design used in the current study should incorporate

random assignment to each of the three conditions. In addition, future research should arrange

for equivalent instruction and grading of dependent variables by utilizing the same professor

across all three conditions. In addition, the professor should work to maintain a consistent

grading style across each section from midterm to final examination. In contrast to this argument,

the utilization of two professors is consistent with college level instruction, and represents a

realistic view of collegial level education.

The midterm and final examination were not identical tests. The utilization of non-

identical exams may be a limitation because each exam may have provoked a different level of

anxiety, and may have caused the students to perform differently based on the material

presented. In future research, the midterm and final examination should be identical exams in

order to control for unintentional influences, such as differing levels of question difficulty.

However, exams administered in college classrooms are usually based on recently presented

information, not replicated tests. The utilization of an examination with the same weight and

number of questions, yet different information, may resemble a more accurate depiction of

collegial examination.

Another limitation was the meeting times of each of the three interventions. The class

section assigned as the CB-based intervention started at 4:10 p.m. on Tuesdays, the MAC-based

intervention started at 7:00 p.m. on Tuesdays, and the no-treatment control group started at 4:10

p.m. on Thursdays. The day and time difference may have affected the participants' functioning

and attention levels. Future research should strive to engage in data collection during the same

day and time across all groups. Data collected at consistent dates and times would support more

control over outside circumstances that may change from day to day, or across the course of a

single day, such as the person's mood, nutrition, attention, alertness, etc.

The study was limited due to the brevity of the intervention. Working in a college setting

the research was built around the start and end of the semester and was kept short in order to

meet educational requirements set forth by the institution pertaining to the Movies and Music

course. Research conducted in the future should contain additional intervention lectures, with

greater emphasis on practicing theory-specific skills within the context of the classroom

instruction, rather than merely encouraging what is inevitably unreliable outside of class practice.

In addition, the lectures should be spread out across a greater length of time. Spreading the

lectures out would allow for the participants to take the information obtained and implement it

with greater detail into their lives and academic environment.

In order to determine the long-term effects of the intervention future researchers should

obtain consent from the participants to contact them 6 months and 12 months post-treatment. The

researcher could administer the CB Knowledge Quiz, the MAC Knowledge Quiz, the ERQ-9, the

MAAS, and the TAI. Obtaining consent to contact the participants at 6 months and 12 months

post-treatment would allow the researcher to further investigate the potency of the intervention

through long-term implementation and practice.

Another limitation to this study was the use of college students at a Division II university.

While the utilization of such a population is warranted, additional research should be conducted

in a variety of settings. Further research should conduct similar studies with professional

musicians in order to look at the direct effect MPA may be having within the music profession

specifically. Even more to this point, evaluating the influence of CB and MAC-based

interventions on actual music performances (e.g., concerts or recitals), rather than within an

audio performance task, would provide more direct examination of the ultimate performance

situation.

This study demonstrated numerous strengths. For example, the current study contributed

to the relatively meager scholarly literature in the area of interventions to combat MPA. It

utilized a specific population within a music context who may have been experiencing test and

MPA. The utilization of a specific population within a music context brings awareness to a

community largely unaware of therapeutic interventions capable of assisting them with their

performance anxiety.

In addition, the study included a three-prong approach to measuring the effects of the interventions by assessing knowledge, attitudes, and behavior. The three-prong approach allowed the effects of the interventions on the dependent variables to be analyzed in specific detail and assisted the researcher in determining what aspects of the intervention may cause clinical change.

Despite the inability to engage in random assignment of participants to conditions, the overall lack of pre-existing differences across groups on the variables of interest was determined by conducting a series of ANOVAs before the interventions were initiated. Conducting these ANOVAs strengthened further statistical analysis because it allowed the researchers to control for pre-existing differences across the three conditions.

The current research project demonstrated that college-aged students are capable of learning and retaining knowledge of CB and MAC theories and concepts as the result of relatively brief, but content dense, interventions (a total of 40 minutes across two sessions) administered in a classroom-style lecture format. Furthermore, the research project demonstrated that college-aged students were able to improve their audio performance scores from midterm to final examination after reported utilization of both CB and MAC-based anxiety reduction and performance enhancement techniques. The improvement in audio performance scores demonstrated the strength of the interventions designed and presented, suggesting the material may be appropriate for classroom therapeutic interventions.

Finally, the research compared both interventions to a no-treatment control group allowing for comparison of the CB and MAC-based interventions to a group of individuals receiving no intervention. This comparison allowed the researcher to discover both interventions are appropriate in improving audio performance when compared to normal class instruction with no anxiety or performance enhancement techniques.

Clinical Implications

Current literature is limited on MPA and little is known about the reduction of anxiety symptoms with the use of MAC-based interventions. In addition, only one study has been noted to look at the direct impact of CB-based interventions on MPA specifically (Clark & Argas, 1991). No studies have been known to compare CB and MAC-based interventions directly, not to mention inclusion of a no-treatment control group. With little research in the MPA field, the most effective form of intervention has not yet been determined. The clinical implication of this study is valuable in that it was the first to compare these two interventions against a no-treatment control group for individuals experiencing performance anxiety in a music context. Therefore, the current study has laid foundational steps in determining appropriate therapeutic approaches in treating performance anxiety, and even more specifically, MPA. Through this study and future research, clinicians can reference scientific evaluations of specific interventions in order to improve their practice and better assist their clients in the reduction of their performance anxiety-related symptoms.

In addition, most musicians are unaware that therapeutic approaches have been developed to address the symptomatology associated with MPA. Through the research reported herein, awareness may be brought to a population that could dramatically benefit from the types of interventions described. Within the music performance world, performance anxiety is often seen as a personal weakness, with the additional implication that truly competent musicians will find a way to cope on their own, absent professional assistance. Providing education to increase awareness of interventions that are available, and dissemination of research such as the current study, may serve to foster acceptance of, and encourage access to, professional help in the area of MPA among members of the music performance community.

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Footnotes

[1] Hedges' *g* is a variation of Cohen's *d* that corrects for biases due to small sample sizes (Cohen, 1988). The magnitude of Hedges' *g* may be interpreted using Cohen's (1988, 1992) convention as small (0.2), medium (0.5), and large (0.8).

[2] Cohen's *d* is an effect size, which expresses the difference between two means in standard deviation units. Cohen (1988, 1992) has made suggestions on what constitutes a large or small effect: $d = 0.2$ (small), 0.5 (medium), and 0.8 (large).

[3] The correlation coefficient has to lie between -1 to +1. A coefficient of +1 represents a perfect positive relationships, while a coefficient of -1 represents a perfect negative relationship, and a coefficient of 0 represents no relationship (Field, 2013, p. 270). Andy Field (2013) noted greater than +.1 or less than -.1 represents a small effect, greater than +.3 or less than -.3 represents a medium effect, and greater than +.5 or less than -.5 represents a large effect. Specifically, he recommends interpreting the size of the correlation within the context of the research instead of relying on the recommendations above blindly.

Table 1
Bivariate correlations among the 7 pre-test score variables

		Pre-CB Knowledge Quiz	Pre-MAC Knowledge Quiz	Pre-ERQ-9	Pre-MAAS	Pre-TAI	Midterm Audio Performance	Midterm Written Examination
Pre-CB Knowledge Quiz	Pearson Correlation	1	.217	-.174	-.065	.060	.289[*]	.010
	Sig. (2-tailed)		.077	.160	.600	.629	.018	.939
	N	67	67	67	67	67	67	67
Pre-MAC Knowledge Quiz	Pearson Correlation	.217	1	-.174	-.203	-.145	.266[*]	.357[**]
	Sig. (2-tailed)	.077		.159	.099	.243	.030	.003
	N	67	67	67	67	67	67	67
Pre-ERQ-9	Pearson Correlation	-.174	-.174	1	.212	.025	.031	-.191
	Sig. (2-tailed)	.160	.159		.085	.838	.800	.122
	N	67	67	67	67	67	67	67
Pre-MAAS	Pearson Correlation	-.065	-.203	.212	1	-.328[**]	-.134	-.143
	Sig. (2-tailed)	.600	.099	.085		.007	.280	.249
	N	67	67	67	67	67	67	67
Pre-TAI	Pearson Correlation	.060	-.145	.025	-.328[**]	1	-.239	-.225
	Sig. (2-tailed)	.629	.243	.838	.007		.052	.067
	N	67	67	67	67	67	67	67
Midterm Audio Performance	Pearson Correlation	.289[*]	.266[*]	.031	-.134	-.239	1	.414[**]
	Sig. (2-tailed)	.018	.030	.800	.280	.052		.001
	N	67	67	67	67	67	67	67
Midterm Written Examination	Pearson Correlation	.010	.357[**]	-.191	-.143	-.225	.414[**]	1
	Sig. (2-tailed)	.939	.003	.122	.249	.067	.001	
	N	67	67	67	67	67	67	67

Note. * = Correlation is significant at the 0.05 level (2-tailed).
Note. * * = Correlation is significant at the 0.01 level (2-tailed).

Table 2

Bivariate correlations among the 7 dependent variables (pre- to post-test change scores)

|		CB Knowledge Quiz	MAC Knowledge Quiz	ERQ-9	MAAS	TAI	Audio Performance	Written Examination
CB Knowledge Quiz	Pearson Correlation	1	.244[*]	.213	-.078	-.069	.086	.180
	Sig. (2-tailed)		.047	.083	.529	.582	.489	.145
	N	67	67	67	67	67	67	67
MAC Knowledge Quiz	Pearson Correlation	.244[*]	1	.127	.016	-.053	.050	.093
	Sig. (2-tailed)	.047		.306	.898	.670	.686	.455
	N	67	67	67	67	67	67	67
ERQ-9	Pearson Correlation	.213	.127	1	.194	-.140	.116	.073
	Sig. (2-tailed)	.083	.306		.115	.260	.351	.558
	N	67	67	67	67	67	67	67
MAAS	Pearson Correlation	-.078	.016	.194	1	-.222	.058	.085
	Sig. (2-tailed)	.529	.898	.115		.071	.641	.493
	N	67	67	67	67	67	67	67
TAI	Pearson Correlation	-.069	-.053	-.140	-.222	1	-.073	-.046
	Sig. (2-tailed)	.582	.670	.260	.071		.559	.712
	N	67	67	67	67	67	67	67
Audio Performance	Pearson Correlation	.086	.050	.116	.058	-.073	1	.162
	Sig. (2-tailed)	.489	.686	.351	.641	.559		.189
	N	67	67	67	67	67	67	67
Written Examination	Pearson Correlation	.180	.093	.073	.085	-.046	.162	1
	Sig. (2-tailed)	.145	.455	.558	.493	.712	.189	
	N	67	67	67	67	67	67	67

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

Table 3

Extreme Outliers and Their Winsorized Replacement Values by Variable, Condition, and Case Number

| Variable	Condition	Case Number	Original Value	Winsorized Value
ERQ-9	CB Intervention	311	-22	-18
ERQ-9	CB Intervention	321	24	12
ERQ-9	No-Treatment Control	303	-34*	-18
ERQ-9	No-Treatment Control	413	-20	-18
MAAS	CB Intervention	221	-1.73	-1.07
MAAS	CB Intervention	271	1.66	1.16
MAAS	CB Intervention	311	-1.87	-1.07
MAAS	MAC Intervention	192	-1.74	-1.07
MAAS	No-Treatment Control	113	-1.50	-1.07
MAAS	No-Treatment Control	243	-1.60	-1.07
MAAS	No-Treatment Control	263	-2.54*	-1.07
TAI	CB Intervention	251	-36	-26
TAI	CB Intervention	331	-32	-26
TAI	CB Intervention	351	58*	19
Written Examination	CB Intervention	341	33	22
Written Examination	MAC Intervention	192	30	22
Written Examination	MAC Intervention	252	37	22
Written Examination	No-Treatment Control	303	-31	-17
Written Examination	No-Treatment Control	423	31	22
Audio Performance	CB Intervention	341	60	50
Audio Performance	MAC Intervention	202	60	50
Audio Performance	No-Treatment Control	153	60	50
Audio Performance	No-Treatment Control	283	-65*	-25
Audio Performance	No-Treatment Control	313	-35	-25
Audio Performance	No-Treatment Control	353	-35	-25
Audio Performance	No-Treatment Control	373	55	50

Note. * = Extreme outliers (i.e. 3 times the interquartile range)
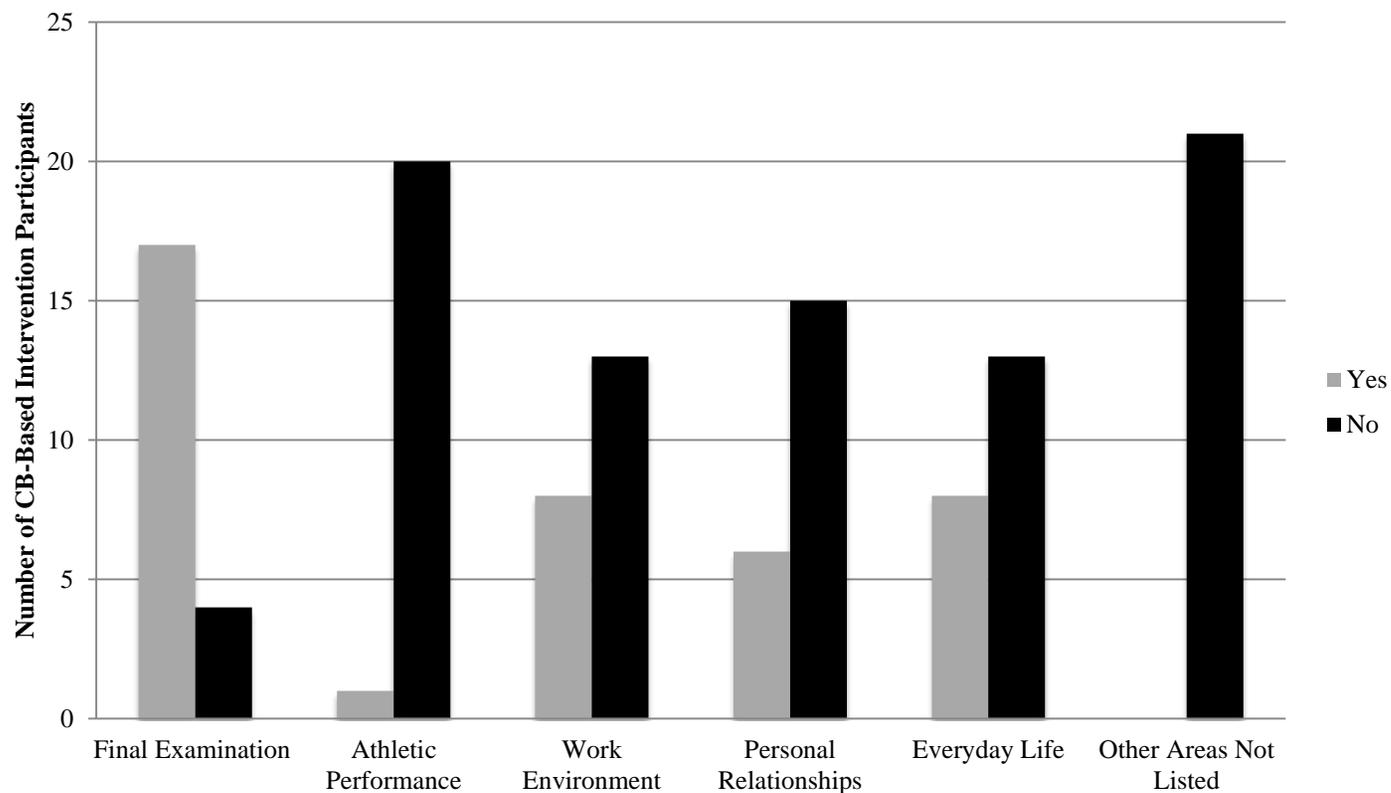
Figure 1. Results of the CB-based intervention data frequency in relation to the number of participants who applied the anxiety reduction techniques to the final examination, atheltic performance, work environment, personal relationships, everyday life, and other areas not listed.
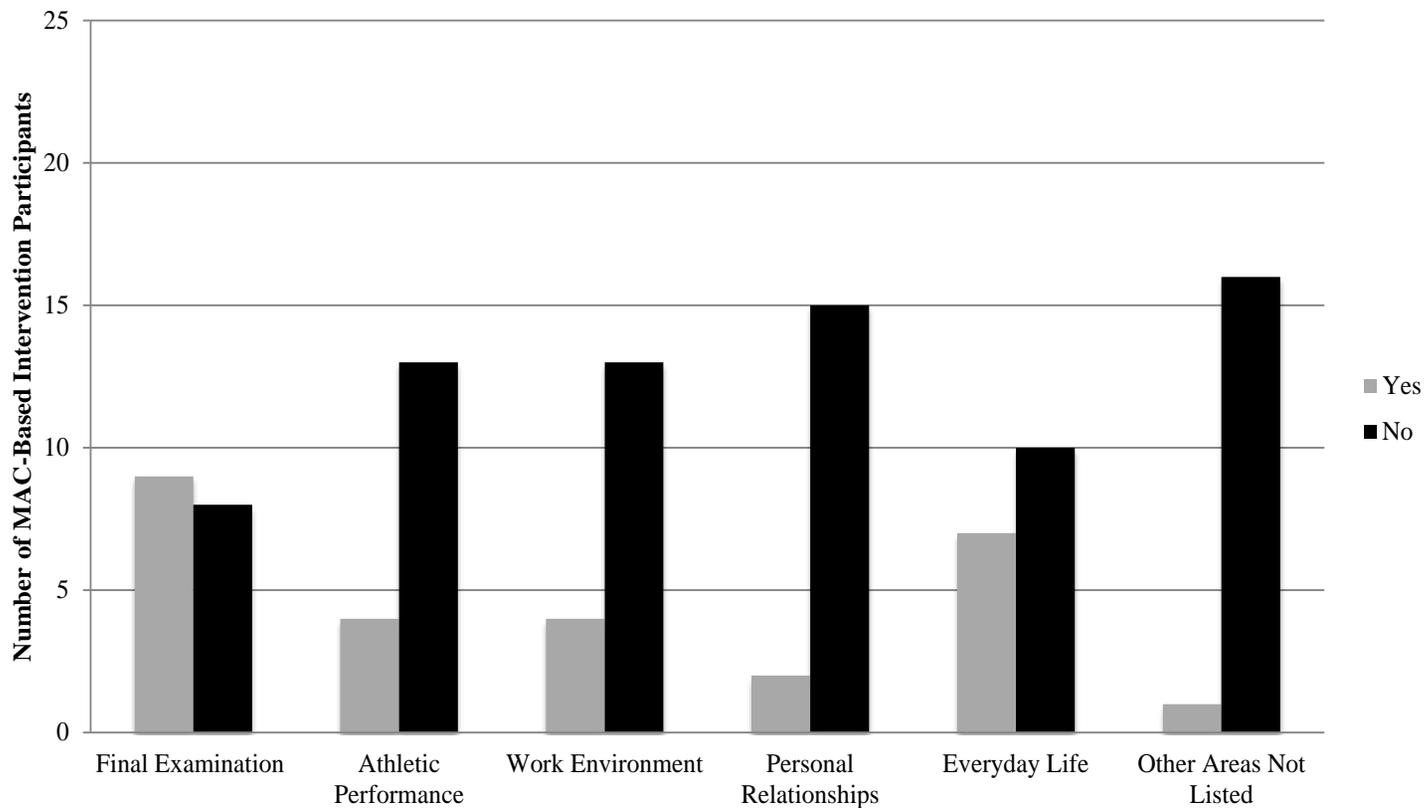
Figure 2. Results of the MAC-based intervention data frequency in relation to the number of participants who applied the anxiety reduction techniques to the final examination, atheltic performance, work environment, personal relationships, everyday life, and other areas not listed.
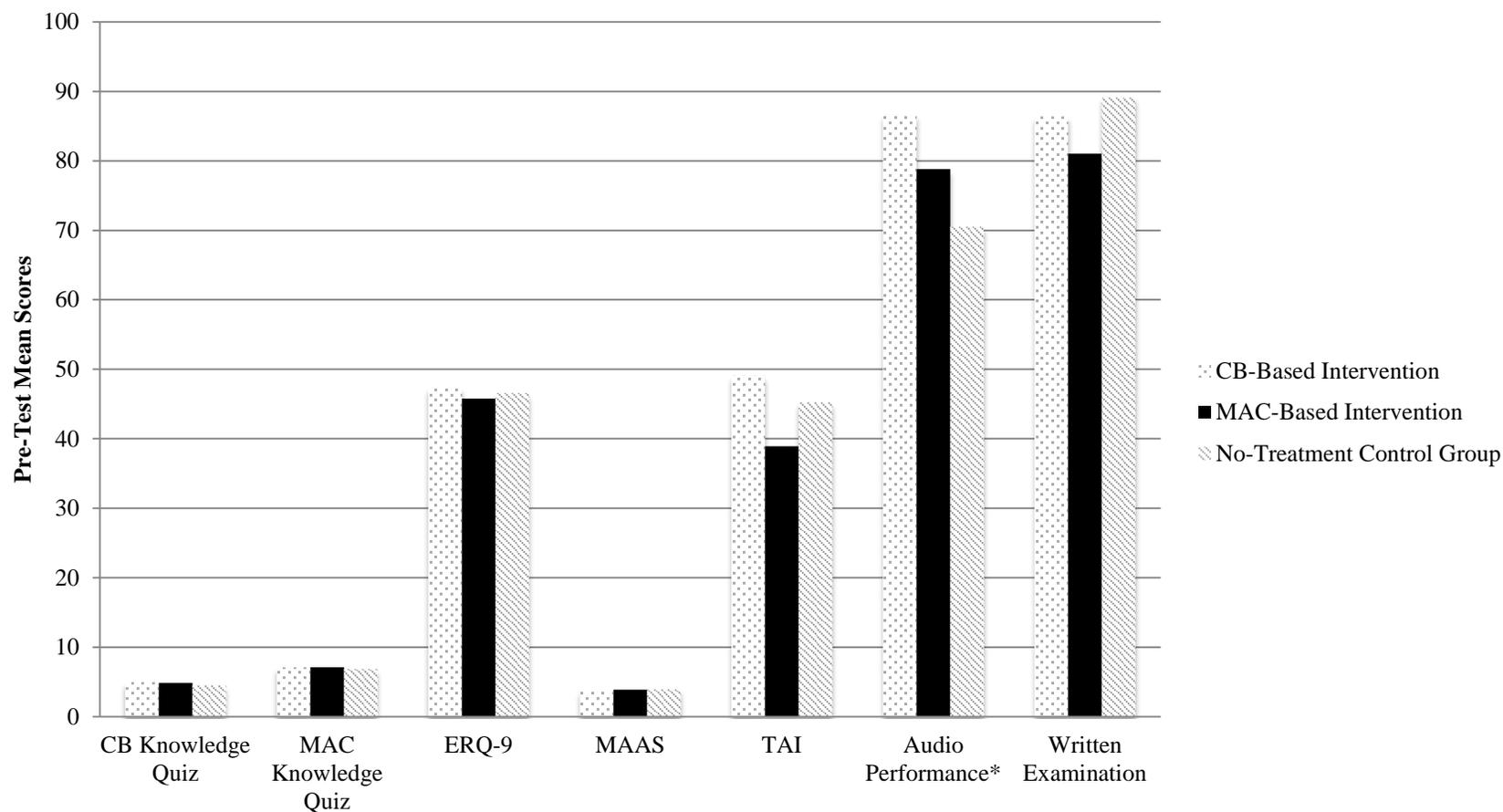
Note. * = Post hoc examinations of pairwise comparisons using Bonferroni corrections found significant differences among the 3 independent variables.

Figure 3. Results of pre-test mean scores for each variable (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, TAI, Audio Performance, Written Examination) grouped by independent variables (CB-based intervention, MAC-based intervention, and no treatment control).
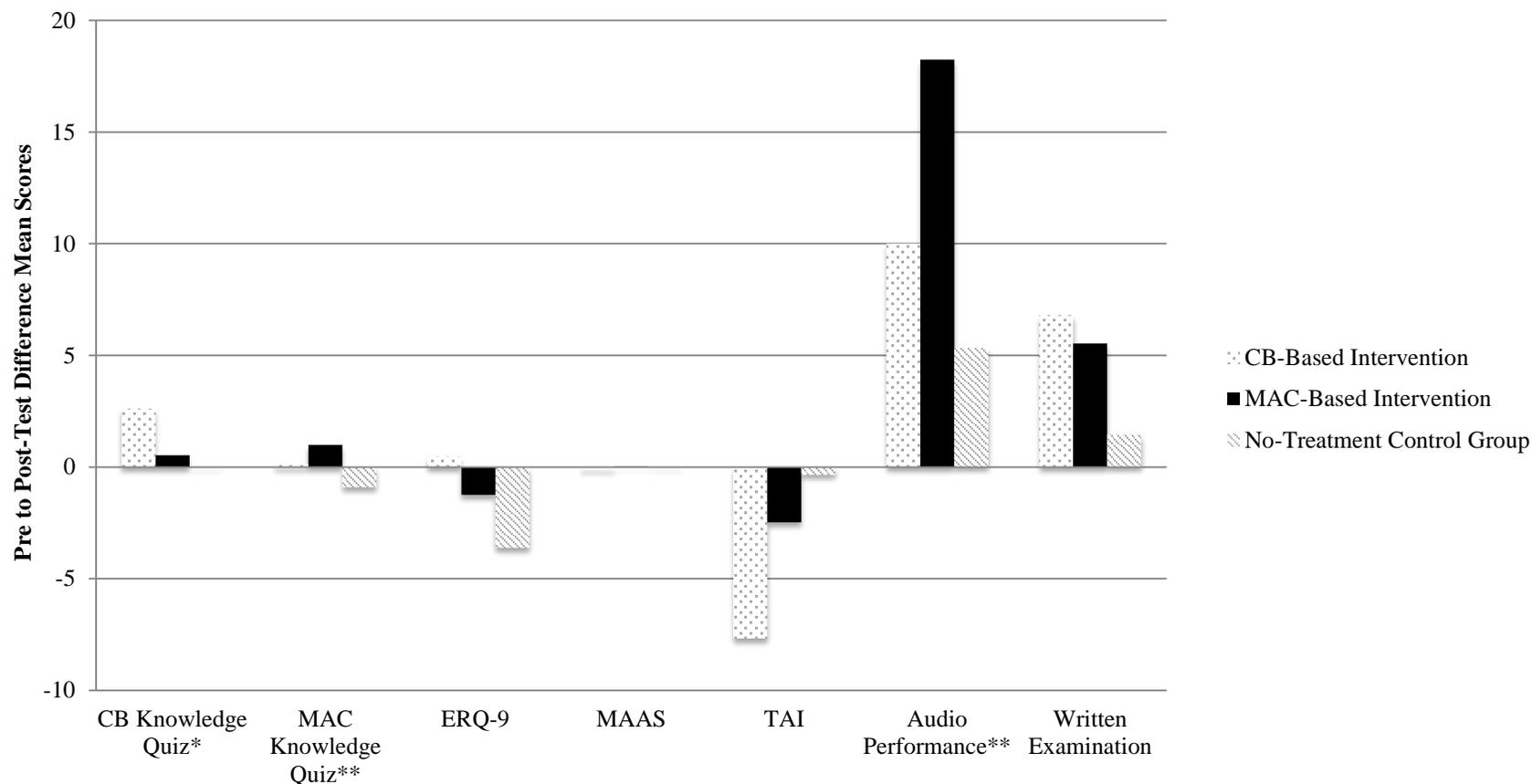
Note. * = Post hoc examinations of pairwise comparisons using Bonferroni corrections found significant differences among the 3 independent variables.

Note. ** = Post hoc examinations of pairwise comparisons using Bonferroni corrections found partial significant differences among the 3 independent variables.

Figure 4. Results of pre- to post-test difference mean scores for each dependent variable (CB Knowledge Quiz, MAC Knowledge Quiz, ERQ-9, MAAS, TAI, Audio Performance, Written Examination) grouped by independent variables (CB-based intervention, MAC-based intervention, and no treatment control).

Appendix A

<u>Demographic Questionnaire</u>

Name: _____

Check the appropriate response

Gender:

☐Male   ☐Female   ☐Other

Age:

☐ 20 and under   ☐ 41-50

☐ 21-30   ☐ 51-60

☐ 31-40   ☐ 61 and over

Ethnic Background:

☐ White / Caucasian

☐ Hispanic / Latino

☐ Black / African American

☐ Native American / American Indian

☐ Asian / Pacific Islander

☐ Other

Research Number:_____

(For researchers only)

Appendix B

<u>Cognitive Behavioral Knowledge Quiz</u>

Circle the answer that best answers each question.

1. The "T" in the S.T.E.B. model stands for?
    a. Thoughts
    b. Target
    c. Temporal Theory
    d. Thalamus

2. The foundation of CBT is in your _____.
    a. Attitude
    b. Cognitions
    c. Emotions
    d. Behavior

3. Your behavior controls your emotions according to CBT theory.
    a. True
    b. False

4. Cognitive Distortions are _____.
    a. Distortions in the physiological makeup of an individual's mind
    b. Exaggerated or irrational thought patterns
    c. Associated with healthy psychological functioning
    d. Based around the principle that our behavior governs all thoughts

5. The S in the S.T.E.B. model stands for_____?
    a. Situation
    b. Science
    c. State
    d. Social

6. Automatic thoughts are the easiest to change.
    a. True
    b. False

7. _____ is an example of a cognitive distortion.
    a. Mind reading
    b. Should statements
    c. Overgeneralization
    d. All of the above

8. The first step in CBT is to _____.
    a. Identify your behavior
    b. Identify your thoughts
    c. Recognize your mistakes
    d. Try to control your anxiety

9. When having thoughts of test anxiety it is best to_____.
    a. Try to not think about them
    b. Ignore them
    c. Work through them and replace them with more constructive thoughts
    d. Discuss them with other people

10. "Because I am so nervous I am bound to fail the exam." – This statement is an example
    of an Emotional Reasoning Cognitive Distortion.
    a. True
    b. False

Appendix C

Mindfulness, Acceptance, and Commitment Knowledge Quiz

Circle the answer that best answers each question.

1. When can you use mindfulness techniques?
   a. During times of stress
   b. Only when you are relaxed and preparing to sleep
   c. When you are in motion on the go
   d. Any time – Any place

2. What is mindfulness?
   a. Getting lost in my thoughts and feelings
   b. Deliberate and nonjudgmental attention to the present moment
   c. Daydreaming or thinking
   d. Being preoccupied with the future or past

3. The practice of Mindfulness originated from _____?
   a. Qigong (Chi-gong)
   b. Buddhism
   c. Native American Ceremonies
   d. Yoga

4. When breathing properly your Abdomen will expand and shoulders will relax.
   a. True
   b. False

5. Which statement applies to the general population?
   a. When extremely aroused you perform your best
   b. When exhausted you perform your best
   c. You perform your worst when you are unaware of your arousal
   d. When slightly but not overly aroused you will perform your best

6. What senses should you be aware of in mindfulness of the external world?
   a. Sight and touch
   b. Taste, smell, touch
   c. Sight, touch, taste, smell, hearing
   d. Hearing and sight

7. Thoughts are facts.
   a. True
   b. False

8. Thinking about what you're thinking is called _____.
    a. Meta-cognition
    b. Thought disorder
    c. Meditation
    d. Meta-communication

9. Mindfulness's foundation is in changing your thoughts.
    a. True
    b. False

10. The statement below best summarizes Mindfulness practice.
    a. Breath, Mindfulness of external world, Mindfulness of thoughts
    b. Thoughts are not facts; they are simply what your mind is saying or creating at any given moment
    c. Let the sensations/experiences pass they are not good nor bad, positive nor negative, they just are
    d. All of the above

Appendix D

Emotion Regulation Questionnaire
Emotion Regulation Questionnaire (ERQ) Gross & John
9/03

The Emotion Regulation Questionnaire is designed to assess individual differences in the habitual use of two emotion regulation strategies: cognitive reappraisal and expressive suppression.

Citation

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85,* 348-362.

Instructions and Items

We would like to ask you some questions about your emotional life, in particular, how you control (that is, regulate and manage) your emotions. The questions below involve two distinct aspects of your emotional life. One is your emotional experience, or what you feel like inside. The other is your emotional expression, or how you show your emotions in the way you talk, gesture, or behave. Although some of the following questions may seem similar to one another, they differ in important ways. For each item, please answer using the following scale:

```
 1----------------2----------------3----------------4----------------5----------------6---------------7
strongly                                                                                      strongly
disagree                                              neutral                                    agree
```

1 .____ When I want to feel more *positive* emotion (such as joy or amusement), I *change what I'm thinking about*.

2. ____ I keep my emotions to myself.

3. ____ When I want to feel less *negative* emotion (such as sadness or anger), I *change what I'm thinking about*.

4. ____ When I am feeling *positive* emotions, I am careful not to express them.

5. ____ When I'm faced with a stressful situation, I make myself *think about it* in a way that helps me stay calm.

6. ____ I control my emotions by *not expressing them*.

7. ____ When I want to feel more *positive* emotion, I *change the way I'm thinking* about the situation.

8. ____ I control my emotions by *changing the way I think* about the situation I'm in.

9. ____ When I am feeling *negative* emotions, I make sure not to express them.

10. ____When I want to feel less *negative* emotion, I *change the way I'm thinking* about the situation.

Note

Do not change item order, as items 1 and 3 at the beginning of the questionnaire define the terms "positive emotion" and "negative emotion".

Scoring (no reversals)

Reappraisal Items: 1, 3, 5, 7, 8, 10; Suppression Items: 2, 4, 6, 9.

Appendix E

<u>Mindful Attention Awareness Scale</u>

Mindful Attention Awareness Scale (MAAS) Brown & Ryan 2003

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

1	2	3	4	5	6
Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never

1 .____ I could be experiencing some emotion and not be conscious of it until sometime later.

2. ____ I break or spill things because of carelessness, not paying attention, or thinking of something else.

3. ____ I find it difficult to stay focused on what's happening in the present.

4. ____ I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.

5. ____ I tend not to notice feelings of physical tension or discomfort until they really grab my attention.

6. ____ I forget a person's name almost as soon as I've been told it for the first time.

7. ____ It seems I am "running on automatic," without much awareness of what I'm doing.

8. ____ I rush through activities without being really attentive to them.

9. ____ I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.

10. ____ I do jobs or tasks automatically, without being aware of what I'm doing.

11. ____ I find myself listening to someone with one ear, doing something else at the same time.

12. ____ I drive places on 'automatic pilot' and then wonder why I went there.

13. ____ I find myself preoccupied with the future or the past.

14. ____ I find myself doing things without paying attention.

15. ____ I snack without being aware that I'm eating.

Scoring: Calculate the sum of questions 1-15 then divide your total by 15. The higher the score the higher the mindfulness. The highest score is 90 and the lowest score is 15.

Appendix F

Appendix G

Informed Consent

The Department of Psychology supports the practice of protection for human subjects participating in research. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate you are free to withdraw at any time, without penalty.

This experience will have you fill out 6 surveys assessing your demographic information, thoughts, emotions, knowledge of cognitive interventions, knowledge of mindfulness and acceptance interventions, test taking anxiety, and performance anxiety. The surveys will be completely anonymous.

You will be involved in two 20-minute in-class lectures that will include information about techniques commonly used to help reduce test–performance anxiety. The in-class lectures will also include suggestions on how to apply these techniques. You will be encouraged to practice these techniques both within the classroom setting and on your own outside of class.

Your signature below includes granting your permission to have your grades on the midterm and final examinations completed within the MU104 Music course released to the researcher anonymously. No other information regarding your performance or grades in the MU104 course will be released to the experimenter.

Your participation is solicited, but strictly voluntary. Your decision to participate will in no way influence the grade you earn in MU104. Do not hesitate to ask any questions about the study. Be assured that your name will not be associated in any way with the research findings.

We appreciate your cooperation.

Sincerely,

Jonathan Huffman   Dr. Dave Provorse
Bachelor of Arts Psychology   Associate Professor of Psychology
Washburn University   Researcher Advisor
785-221-8101   785-670-1562

_____ _____
Printed name of individual agreeing to participate   Date

_____ _____
Signature of individual agreeing to participate   Date

Appendix H

<u>Informed Consent</u>

The Department of Psychology supports the practice of protection for human subjects participating in research. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate you are free to withdraw at any time, without penalty.

This experience will have you fill out 6 surveys assessing your demographic information, thoughts, emotions, knowledge of cognitive interventions, knowledge of mindfulness and acceptance interventions, test taking anxiety, and performance anxiety. The surveys will be completely anonymous.

Your signature below includes granting your permission to have your grades on the midterm and final examinations completed within the MU104 Music course released to the researcher anonymously. No other information regarding your performance or grades in the MU104 course will be released to the experimenter.

Your participation is solicited, but strictly voluntary. Your decision to participate will in no way influence the grade you earn in MU104. Do not hesitate to ask any questions about the study. Be assured that your name will not be associated in any way with the research findings.

We appreciate your cooperation.

Sincerely,

Jonathan Huffman   Dr. Dave Provorse
Bachelor of Arts Psychology   Associate Professor of Psychology
Washburn University   Researcher Advisor
785-221-8101   785-670-1562

_____ _____
Printed name of individual agreeing to participate   Date

_____ _____
Signature of individual agreeing to participate   Date

Appendix I

Cognitive Distortions

Cognitive Distortion	**Characteristics**	**Example**
All or Nothing Thinking	Absolute / black or white	"If I get one question wrong I will fail the test and the entire semester is ruined."
Overgeneralization	One single event depicts everything	"I always screw up on tests."
Disqualifying the Positive	"Shooting down" positive experiences	"It was pure luck that I passed that exam."
"Should" Statements	Placing demands on the self, others, or world.	"I should be able to do better than a B on this exam."
Labeling	Explaining by naming or assigning labels	"I am so stupid for thinking I could take this course."
Emotional Reasoning	Making decisions based on feelings only	"Because I am so nervous I will fail this exam."
Mind Reading	Assuming the intentions of others	"If I fail this exam my friends will think I am stupid."
Fortune Telling	Anticipating the outcome	"I will never pass this class."
Magnification	Blowing out of proportion/shrinking	"I messed up the essay section of the exam and now I'm a complete failure."

Fallacies

Fallacies	**Characteristics**	**Example**
Control	Attempt to control all aspects of life or situation	"I must be able to control all sensations in my body and all of the events in my life."
Change	Believe change is the best answer to their problem	"If my situation were different, all my problems would disappear."
Worry	Worry = Resolution	"If I worry enough, I will pass the exam."
Ignoring	Neglect = Resolution	"If I don't pay attention, I will not be held responsible and it will go away."
Fairness	Life should be equal	"People aren't treating me fair, that's why I am failing."
Attachment	Rely on relationships to fix the problem	"If I was in a relationship, all my problems would be solved."

Appendix J

S.T.E.B. Chart

STEB MODEL: **Additional Notes:**

S – SITUATION

T – THOUGHT

E – EMOTION

B – BEHAVIOR

SITUATION	THOUGHT	EMOTION	BEHAVIOR

SITUATION	THOUGHT	EMOTION	BEHAVIOR

SITUATION	THOUGHT	EMOTION	BEHAVIOR

Appendix K

Follow-Up Questionnaire

Check the appropriate response

Were you in attendance for last weeks in-class lecture on anxiety reduction?

☐ I was in attendance   ☐ I was NOT in attendance

How often did you practice these techniques?

☐ Never   ☐ 5-6

☐ 1-2   ☐ 7 or more

☐ 3-4

In what area did you apply these techniques?

☐ Final Examination

☐ Athletic Performance

☐ Work Environment

☐ Personal Relationships

☐ Everyday Life

☐ Other

☐ I did not apply these techniques.

Research Number:_____

(For researchers only)