An Examination of Music Majors' Exercise Motivations and Readiness for Change

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ABSTRACT

This dissertation examined hypothesized differences in college students' exercise behaviors, motivations, and readiness for change. Previous research confirms longstanding health benefits of regular physical activity and corresponding wellbeing and mortality risks of a sedentary lifestyle. Despite this evidence, people become increasingly more inactive over time. Overall, college students perpetuate these life-long sedentariness trends. Music students encounter physical performance demands unique to degree programs, endorsing more physical and mental health complaints than most undergraduates. Self-determination theory and the transtheoretical model of behavior change postulate individuals with strong self-directed motivations and willingness to enact behavior changes are more likely to be physically active.

This project's purpose was two-fold: to determine the differences in music majors' exercise behaviors, motivation, and readiness for exercise behavior change, and to examine the extent to which exercise motivations and readiness for change predict exercise behaviors. Selection controls comprised two criteria: (1) being 18 years of age or older and (2) being currently enrolled in a 4-year college or university. The participant sample (N = 214) consisted of 100 non-music and 114 music majors. They completed an online survey containing the following: an informed consent, Basic Demographics Questionnaire (BDQ), Godin Leisure-Time Physical Activity Questionnaire (GLTPAQ), Stanford Brief Activity Survey (SBAS), Exercise Motivation Scale (EMS), and University of Rhode Island Change Assessment - Exercise 2 (URICA-E2). Descriptive statistics, Multiple Analyses of Variance (MANOVAs), and multiple linear regressions were used in data analysis.

Results indicate music majors' and non-music majors' exercise behaviors, motivations, and readiness for change significantly differed. Music majors reported engaging in significantly

less physical activity and endorsed more amotivation towards exercise, while non-music majors were more active and made stronger endorsements for three more self-determined motivations. Music students did not differ in their overall readiness for change score, but they made significantly stronger endorsements of precontemplation statements. The results of the regression analyses suggested music students who endorsed more self-directed extrinsic motivations and maintenance-stage statements exercised more frequently and had greater levels of global physical activity. Results of the above analyses are discussed, including implications for future research and calls for targeted, evidence-based interventions.

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CHAPTER 1: INTRODUCTION AND REVIEW OF LITERATURE

In the United States (U.S.), sedentary lifestyles are commonplace, but this proclivity for inactivity and long periods of daily sitting has far-reaching consequences. According to the Centers for Disease Control (CDC) and U.S. Department of Health and Human Services (Centers for Disease Control and Prevention, 2011; U.S. Department of Health and Human Services, 2010a; U.S. Department of Health and Human Services, 2010b), physical inactivity is estimated to contribute to 300,000 deaths per year in the US, with sedentariness increasing mortality risks from all causes (Loprinzi, Edwards, Sng, & Addoh, 2016; Katzmarzyk Church, Craig, & Bouchard, 2009). Physical inactivity is also positively correlated with obesity, diabetes, depression, and suicidality rates, all significant threats to a healthy quality of life (Centers for Disease Control and Prevention, 2011, 2014; Prakash, 2002). In other words, physical inactivity is a health epidemic in the United States, and a sedentary lifestyle is an individual's greatest risk for mortality and poor quality of life.

Regular Physical Activity and its Holistic Health Benefits

Just as chronic physical inactivity carries significant health risks, regular physical activity yields enduring, pervasive health benefits. In a review of the literature, Warburton, Nicol, and Bredin (2006) found "irrefutable evidence" (p. 801) that regular physical activity adaptively strengthens cardiovascular, digestive, immune, and musculoskeletal systems. Although the changes in the body's functioning provides secondary prevention of illness and mortality risk, simply engagement in regular physical activity reduces risks of mortality and chronic disease (Penedo & Dahn, 2005; Warburton et al., 2006). Regular physical activity can also positively impact on mental health. In Fox's (1999) review of the literature, the researcher found physical activity to be an efficacious treatment for clinical depression, lessening the negative impact of

low-self esteem, anxiety symptoms, and self-deprecating perceptions and stabilizing mood. Regular physical activity and organized sport have been shown to create opportunities for social connection and mitigate the well-being issues associated with social isolation (Barton, Griffin, & Pretty, 2012; Gore, Farrell, & Gordon, 2001). The consensus is clear, regular physical exercise promotes physical fitness, biological function, prevents chronic disease and debilitation, and attenuates mental illness symptoms (Barton, et al., 2012; Fox, 1999; Katzmarzyk et al., 2009; Penedo & Dahn, 2005; Warburton, et al., 2006).

Given the consensus that regular physical activity is a boon for individual and public health, the CDC, American Heart Association (AHA) and American College of Sports Medicine (ACSM) (Haskell et al., 2007; Pate et al., 1995) issued a sweeping public health recommendation to engage in at least 30 minutes of moderate-to-vigorous intensity physical activity a minimum of three - but preferably five - days per week. Despite the benefits, people become more sedentary across the lifespan. In national surveys, just under half of high school students reported engaging in moderate-to-vigorous physical activity at least five days per week (National Physical Activity Plan Alliance, 2016). About 30% of 18-24 year olds and 15% of older adults (ages 65-74) reported meeting the federal physical activity guidelines (Clarke, Norris, & Schiller, 2017). Worse still, participants consistently over-report their levels of physical activity compared to accelerometer data (Dyrstad, Hansen, Holme, & Anderssen, 2014; Troiano et al., 2008). In opposition with children's self-reported 50% compliance with federal activity guidelines, accelerometer data identified 42.5% of 6-11 year olds and less than 8% of 12-19 year olds as meeting physical activity criteria. As people age, they not only become less active, they are less likely to honestly report their habitual sedentariness.

Self-Determination Theory of Motivation

Motivation to exercise is an influential factor in adopting and adhering to regular exercise regimens (Hagger & Chatzisarantis, 2007). Self-determination theory (SDT) proposes that the motivation to engage in all behaviors is influenced by the actor's perceived locus of control (Deci & Ryan, 1985). SDT differentiates components of motivation, in doing so emphasizing that motivational context becomes a stronger determinant for action than the amount of motivation (Deci & Ryan, 2008). Motivation writ large is defined by the strength and direction applied to behavioral engagement, but self-determination theory conceptualizes eight facets of motivation that vary in levels of self-determined (intrinsic) and other- or externally-determined aspects. Extrinsic motivating factors originate from a source external to the person engaging in a specific behavior, and include expectations of others, obligation, social standards, and individuals' desires adopted via persuasion, social influence, conformity, and obedience. Intrinsic motivation originates internally, defined by a focus on learning, accomplishing, and engaging the senses (Ryan & Deci, 2000).

Developments in self-determination theory led to the formulation of a continuum perspective on development of motivation. Ryan & Deci (1991) conceptualized the following eight different forms of motivation, ranging from fully external to fully internal locus: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, intrinsic motivation to learn, intrinsic motivation to accomplish, and intrinsic motivation for sensation (Deci, Vallerand, Pelletier, & Ryan 1991). Amotivation is the absence of motive, and does not drive behavior change or activation. External regulation is the only facet that is entirely extrinsic, where others or environmental contingencies control determinations for action (Deci & Ryan, 2008). Introjected regulation manifests as a desire to avoid shame, seek

validation of self-esteem and -worth in others, and a social pressure for conformity and obedience. External regulation and introjected regulation are the most extrinsic forms, termed controlled motivation (2008).

As the continuum shifts from externalized to internalized locus, the actor has at least identified personally with the behavior's value. Identified regulation, and integrated regulation are somewhat to mostly intrinsically motivated, but social pressures and standards for behaviors become more integrated into the self (Deci et al., 1991; Deci & Ryan, 2008). The three remaining facets of motivation -IM to learn, accomplish tasks, and experience sensations are wholly intrinsic, and represent a person's seeking after the fulfillment of exploratory learning, accomplishment and task mastery, and the satisfaction being engaged (Li, 1999; Ryan & Deci, 2000). As a concept, intrinsic motivation has been studied as a single construct or collection of three, but all from the self-determination theoretical foundation (Wininger, 2007).

Recent developments in self-determination theory posit a simplex-model of motivational development, wherein individuals engage in a linear progression across the continuum of 8 motivation dimensions (Li, 1999; Wininger, 2007). Whereas more extrinsic motivations are influenced by the presence of external pressure and are prone to dips in strength and direction, intrinsic motivation is more stable and enduring regarding adoption and adherence of exercise behavior. The simplex model is a conceptual representation of an individual's developmental path toward actualizing the intrinsically motivating aspects of behavior, which culminates in more autonomous and fulfilling experiences (Deci & Ryan, 2008).

Transtheoretical Model of Behavior Change

SDT motivational concepts describe the impetus for behavior, whereas models of behavior change outline initiating, adopting, and maintaining (or discontinuing) a change in

behavior. The most prominent model of behavior change, the Transtheoretical Model (TTM), was initially developed to conceptualize cessation of smoking and other addictions (Prochaska, & DiClemente, 1982; Prochaska & DiClemente, 1986). It has since been adopted for a range of individual, group, social, and public health behavior change endeavors, having been modified to globally describe the process of behavior change (Prochaska, 2013; Prochaska & Velicer, 1997; DiClemente, Schlundt, & Gemmell, 2004).

The most current model of behavior change geared toward regular physical activity engagement includes five stages: Precontemplation, Contemplation, Preparation, Action, Maintenance (Prochaska, 2013). In precontemplation, the person endorses no intention for changing behaviors. Contemplation is a stage marked by a person's intent to make a change within six months but displays no overt progress or action. Preparation is a stage where the person has indicated some behavioral action but not toward the intended change; rather, the person is setting some goals, building relationships, or otherwise interacting with the environment to improve readiness. Action is a stage where behavioral change has been initiated, but for less than six months. Maintenance is the final and recurrent stage of exercise behavior change, in which behavior has changed consistently for at least 6 months (Prochaska, 2013). Physical activity behaviors like regular exercise are designed to be maintained, as opposed to addictive behaviors the person wishes to terminate, the final stage of the original TTM (DiClemente & Hughes, 1990).

Whereas SDT scholars posit a linear progression to more stable intrinsic motivation, some flexibility is incorporated into the TTM stages. Conceptualized as a punctuated equilibrium, stage development is more flexible and progression through stages occurs in variable succession of personal progress and stagnation (Prochaska, Wright, & Velicer, 2008;

Reed, 1995). Motivation plays an important role in some of the processes of change that help punctuate development. Extrinsic motivation corresponds with reinforcement management and counterconditioning of earlier stages, while building self-awareness and becoming more self-evaluative correspond with action, maintenance, and intrinsic motivation (Prochaska, 2013). In combination, motivation and behavior change concepts endeavor to explain adoption and adherence experience in different contexts, including exercise.

College Students and Physical Activity

Despite research highlighting the benefits of physical activity and dangers of sedentariness (Centers for Disease Control and Prevention, 2011; Fox, 1999; Katzmarzyk et al., 2009; Penedo & Dahn, 2005; U.S. Department of Health and Human Services, 2010a; U.S. Department of Health and Human Services, 2010b; Warburton et al., 2006) and efficacious theories outlining motivation (Deci & Ryan, 2008) and behavior change (Prochaska, 2013) processes, people struggle to maintain physical activity throughout the lifespan. Adolescence and young adulthood are critical developmental periods during which a lifelong decline in physical activity begins (Clarke, et al., 2017; National Physical Activity Plan Alliance, 2016). As such, college and universities are uniquely positioned to intervene on behalf of U.S. public health.

Nearly 27 million students attend colleges and universities in the U.S. (Ginder, Kelly-Reid, & Mann, 2017), and most colleges offer opportunities to engage in regular exercise via collegiate athletics, intramurals, fitness courses, group activity classes, personal training, and fitness facility memberships. Despite these opportunities for engagement, only 39% of college students report using these resources three times weekly, and 21% reported they never utilize campus recreation resources (Forrester, 2014). Additionally, Forrester (2014) identified that

more physically active college students have higher GPA, retention, and graduation rates. Universities have a vested interest in student health, but interventions are not one-size-fits-all. In fact, the Surgeon General and U.S. Department of Health and Human Services recommends targeted solutions for this national epidemic (U.S. Department of Health and Human Services, 2010a; U.S. Department of Health and Human Services, 2010b). As such, university-wide interventions first need to better understand specific college student populations to be effective across the student body.

Music Majors' Health and Physical Activity

In the college setting, music majors are part of a subculture with necessarily unique health demands, attitudes, and experiences, especially regarding exercise and physical activity (Kok, Vlieland, Fiocco, & Nelissen, 2013; Spahn, Struckely, & Lehmann, 2004; Sharma et al., 2008). The National Association of Schools of Music (NASM) (2017) charges each music school to maintain student accessibility to appropriate resources to help them maintain their holistic health, but they emphasize that individual students have the ultimate responsibility for their self-care. Scholarly insights on musicians rebuke this expectation as a best practice. Music students typically develop a singular focus on musical activities from an early age, often deprioritizing and avoiding exercise in favor of more technical training and practice hours (Brandfonbrener, 2009). Research also reveals music students come to college with more psychological and physical health issues relative to non-music major undergraduates (Brandfonbrener, 2009; Ginsborg, Kreutz, Thomas, & Williamon, 2009; Kreutz, Ginsborg, & Williamon, 2009; Spahn, Strukely, & Lehmann 2004; Williamon, Wasley, Burt-Perkins, Ginsborg, & Hildebrandt, 2009; Zander, Voltmer, & Spahn, 2010).

In a German study of health problem prevalence among music majors (n = 247), medical students (n = 266), and student-athletes (n = 71), music students endorsed significantly more playing-related overuse problems, physical symptoms, depressive and anxious symptoms (Spahn et al., 2004). A United Kingdom (U.K.) study assessed music students' (n = 91) self-reports of health and wellness, body-mass index (BMI) and cardiovascular fitness. According to the results, nearly 40% had below average resting heart-rate recovery following exercise, over 40% of men had underweight BMIs, and students endorsed significant fatigue and pain symptoms that affected learning and performance ability (Williamon, 2009). Similar studies from the same U.K. research team provide additional evidence for music students' poorer health perceptions compared to non-music majors; music majors score lower on indices of health responsibility, physical activity, self-regulation, and self-ratings of health, all while endorsing more psychological and physiological symptoms (Kreutz et al., 2009; Ginsborg et al., 2009).

Brandfonbrener (2009) surveyed freshman music majors (n = 350) and found 79% reported experiencing pain from repetitive playing of music. Kok and colleagues (2013) compared musculoskeletal complaints of music students (n = 87) and medical students (n = 503) and found music students reported significantly more past and present symptoms. Bernhard and Christian (2007), later replicated by Bernhard (2010), surveyed music students and non-music students, and discovered all college students experience significant symptoms of burnout, including increased emotional distress and decreased motivation for personal accomplishment. Within the music major, college 3rd and 4th years report more burnout symptoms than 1st and 2nd years (Bernhard & Christian, 2007), while voice and string majors endorsed increased burnout rates compared with brass and woodwind majors (Bernhard, 2010). The results of the above studies detail numerous health issues specific to the life of a music major. The need for

targeted intervention is critical to improve college music student health and resilience to performance-specific demands that differentially affect students based on instrument specialty.

Recent research with music students purports the benefits of regular physical activity on student performance, self-perceptions, and physical and psychological health. In an experiment evaluating music performance when fatigued, Drinkwater and Klopper (2012), 10 woodwind musicians prepared a 10-minute music selection to be played three times consecutively between 3-minute breaks. Participant self-perceived exertion and anxiety, heart, blood pressure, and blood lactate content were measured. Results indicated physically demanding consecutive performance taxes psychological and physiological reactivity. Initially, performance error rates decreased between first and second performance, but marked increases in error rate occurred between the second and final performance. Perceived anxiety and effort, blood pressure, and heart rate occurred increased over time. These results emphasize the mental and physical demands long performances place on musicians.

In a U.K. based experimental study of conservatory music students (n = 46), researchers induced music performance stress on two separate occasions (Wasley, Taylor, Backx, & Williamon, 2012). In the first instance, participants completed a 2-minute bout of maximal effort cycling. In the second instance, participants were informed they were going to perform in front of a panel. Cardiovascular (e.g. resting heart rate, maximal oxygen re-uptake, blood pressure) and state anxiety (i.e. self-report) data were collected. Result revealed a negative association between cardiovascular health and anxiety. Participants with better cardiovascular fitness endorsed fewer anxiety symptoms and were less physiologically reactive to the thought of performing in front of a panel (Wasley et al., 2012). These results further emphasize the taxing

nature of performance demands in the short-term, and the benefits cardiovascular fitness can have on performances and psychological resilience.

Some research exists testing the efficacy of physical activity interventions on music students' health and performance. Ackermann, Adams, and Marshall (2002) evaluated the efficacy of two six-week interventions with music students designed to enhance upper body function. Music students (n = 18) randomly assigned to a strength or endurance training protocol, and both interventions were effective in improving shoulder plane mobility and upper body strength and reducing perceived exertion. Although both interventions were physiologically effective, endurance training garnered the most optimal results regarding musician perceptions. Chan, Driscoll, and Ackermann (2013) corroborate the importance of performance-focused intervention in the prior study, as musicians rate more positively physical activity programs that musculoskeletal systems most associated with their music performance. Although short-term interventions can be effective strategies for enduring change realistically require more time investment and follow-up (Barton, 2008).

In a recent longitudinal study of undergraduate music students (Zander et al., 2010), researchers assessed the effectiveness of a health promotion curriculum administered to music students during their first two years. At baseline, music students (n = 459) reported significantly elevated physical and psychological symptoms than their non-music majors. The intervention group (n = 103) of music students reported fewer symptoms across the three-year study than the control group (n = 103). In addition, the intervention group reported stable performance and concentration over time, while the control group endorsed more struggles. It is important to note music majors reported being in worse health in their first year of undergrad than non-music

majors, making it all the more imperative to proactively and consistently utilize physical activity interventions.

Although some efficacious physical activity intervention studies have been conducted, very limited research exists on music majors' motivations to consistently adhere to physical activity and exercise regimens. In fact, studies indicate music students and marching artists do not identify with their exerciser identity in the same way they do with their strong sense of being a musician (Brandfonbrener, 2009; Levy, Statham, & Van Doren, 2013; Spahn, 2004). Levy and colleagues (2013) conducted a longitudinal study with elite marching artists and found their BMI fluctuated from their training and performing season to the off season. These BMI increases in the off season were correlated with weak exerciser identity, as the marching artists did not persist with regular physical activity outside their required training. Seitz (2017) conducted a study assessing music majors' exerciser identity, confidence to overcome exercise barriers, motivation, and exercise behaviors. Music majors who identified strongly as exercisers were more intrinsically motivated, more confident in their ability to overcome barriers and reported more frequent exercise sessions in the past 90 days. Results of this limited research base indicate music major motivation to exercise and their perceptions of exercise behaviors are critical components that may impact the viability and effectiveness of interventions.

Music majors require rigorous, specialized training, and are a unique subset of the college population. Given the physical demands and specialized skills training music majors encounter, scientists recommend identifying all performing artists - musicians included - as athletes (Koutedakis, & Jamurtas, 2004; Quarrier, 1993). Despite these realities, music performance - even marching arts - is not an adequate replacement for regular physical activity and does not meet federal recommendations for regular physical activity (Strand & Sommer, 2005). Music

majors also encounter unique, repetitive motion without the benefits of athletic cardiovascular and strength training, leaving them vulnerable to stress injuries and burnout (Dick et al., 2013; Lehmann & Ericsson, 1997). Regular physical activity regimens targeted to the specific needs of music majors could help mitigate injury and burnout risks while building broader resiliency and improving performance outcomes. The critical caveat to this need is that the music majors may find it difficult to adopt and stick with a physical activity regimen (Levy et al., 2013; Seitz, 2017). Before widespread interventions become effective for music majors, their motivations and readiness for change needs to be investigated in detail. Understanding the motivations and readiness for change of music majors can be a first step in understanding the larger music culture in which future interventions will be implemented.

Current Study (Design, Purpose, RQs, and Hypotheses)

This dissertation utilized comparative and correlational research designs. The purpose of the study was twofold. A comparative approach was used to determine, relative to the college student population, the differences in music majors' exercise behaviors, motivation to engage in regular exercise, and readiness for exercise behavior change. This study also examined possible differences within musician groups (i.e. music theory majors, music performance majors, marching artists) in exercise behaviors, motivations to engage in regular exercise, and readiness for exercise behavior change. As a final goal, this study examined the extent to which exercise motivations and readiness for change predict exercise behaviors. Using the previous literature as a framework, this dissertation sought to answer the following research questions (RQ) and test correspondent hypotheses (H):

(RQ1) Relative to the general college student population, do music majors differ in their exercise behaviors?

(RQ1a) What differences exist in the frequency, regularity, intensity and choices in types of exercise engagement.

(H1) Relative to the general college student population, Music majors will be less likely to report engaging in regular, moderate-vigorous exercise behaviors.

(RQ2) Relative to the general college student population, do music majors differ in their exercise motivations and stage of change?

(RQ2a) What are the motivations and readiness to exercise that best represent music majors?

(H2) Relative to the general student population, music majors will endorse fewer self-determined motivations and lower Readiness for Change scores.

(RQ3**)** Do music students exercise motivations and readiness predict self-reported exercise behaviors?

(H3) Music students endorsing more self-determined motivations and higher Readiness for Change scores will predict more regular, moderate-vigorous exercise behaviors in self-reports.

CHAPTER II: METHODS

Participants and Procedure

The Institutional Review Board of the University of Tennessee granted permission to conduct this study prior to data collection. A young-adult sample of 227 were procured, required to be at least 18 years of age and currently enrolled college students at the time of participation. All participants were provided with informed consent and told they could cease participation in the study at any time without penalty. Participants were solicited for participation in one of three ways. First, in the classroom, course instructors or the primary investigator provided students with a Research Participation Request (RPR), containing a link to the survey. Second, the primary investigator requested faculty disseminate the RPR electronically; receipt of this request by potential participants was dependent on faculty follow-through. Finally, the survey was posted on the Undergraduate Research Participation (SONA) system at the University of Tennessee. In all cases, administrative permissions were obtained. Due to the public nature of the online survey method, the ability for the survey link to be copied and pasted electronically across social media and e-mail correspondence, and the nature of word of mouth in social settings, some data may have been obtained outside the formal methods of solicitation.

Due to missing and incomplete data, the final sample consisted of 214 college students, comprising 114 music majors and 100 non-music majors from a variety of majors and specializations. Music students that specified their majors (n = 97) used the following categories (frequencies included): 32 Music Education, 24 Music Theory/Composition, and 41 Music Performance (e.g., Violin, Cello, Percussion, Piano, Vocal, String). Additionally, 26 participants identified as currently being engaged in marching arts (e.g., marching band, color guard). Although non-music student recruitment came predominantly from psychology

department faculty and courses, a diverse array of non-music majors (e.g., Kinesiology, Mathematics, Physics, Biology, Chemistry) were reported. Respondents included 188 Undergraduate and 26 Graduate students. Student-athletes (*n* = 13, approximately 6 percent) represented a small minority of the sample. The sample included 40 Freshmen, 74 Sophomores, 37 Juniors, 35 Seniors, 24 Masters, 2 Doctoral, and 2 students who chose to withhold their collegiate year. See Table 1 for demographic information related to academic status.

Respondents were asked to provide information regarding their sociocultural identities (See Table 2). The mean age of participants was 20.73 years, ranging from 18-38 years old. All 214 participants provided their age data, but 3-7 participants declined to respond to other sociocultural items, with three participants declining to respond across all other sociocultural demographics (Table 2 includes 'no answer' frequencies). Respondents distribution of socioeconomic status were as follows: 20 Working, 32 Lower-Middle, 73 Middle, 64 Upper-Middle, 4 Upper, 12 Don't Know, 7 No Answer, and 2 Other. Of 211 respondents, a majority identified as 'not person of color' (n = 180, approximately 84 percent). When asked specifically about their race, 167 students identified as White/Caucasian, with the remaining respondents containing: 12 Asian/Asian American, 6 Black/African American, 12 Hispanic/Latino, 9 Biracial/Multiracial, and 5 Other students. Students who offered additional racial/ethnic information typically specified their multiracial and ethnic backgrounds (e.g., White Persian-American, Half Latino/Half Caucasian, Black/White/Native American), salient national identity (e.g., Korean, Chinese, Polish, Kosovo Albanian-American), or ethnoreligious group (i.e., Jewish). When asked about their birth sex, respondents included 149 female and 61 males. When asked about gender identity, 2 female respondents identified as gender non-binary, with the remaining 147 respondents identifying as women. All birth sex male students (*n* = 60)

reported correspondent masculine gender identity, with the exception of 1 student declining to answer. The sample contained 154 heterosexual participants, with the remaining respondents' sexual identities comprising: 4 Lesbian, 14 Gay, 24 Bisexual, 6 Pansexual, 3 Queer, 1 Fluid, and 5 Other (i.e., 2 asexual, 1 asexual-heteroromantic, 1 demisexual, 1 transmasculine, possibly non-binary). Two respondents identified as falling within the trans identity umbrella.

To determine the number of participants needed, statistical power analyses were conducted using online software from G*Power (Faul, Erdfelder, Buchner, & Lang, 2007, 2009). For each of the G*Power analyses, a population of modest size, $r = .30$, an error probability of .05 level, and a statistical power .80 was utilized to determine recommended sample sizes. The G*Power results indicated a sufficient sample size of 158 participants to detect a correlation in participants self-reported exercise behaviors. To detect a correlation in participants' exercise motivations and readiness for change, a sample of 260 participants was sufficient. To test the predictive utility of exercise motivation and readiness for change on exercise behaviors, a minimum of 114 was necessary to attain .80 statistical power. At an absolute minimum .70 statistical power, G*Power analyses indicated a sample of 216 participants was necessary to conduct all anticipated statistical analyses. To attain the ideal statistical power of .95 to run all anticipated analyses, a sample of 386 is necessary, and would achieve the most robust results. The final sample size of 214 exceeded the required size to detect correlations in self-reported exercise behaviors (RQ1/Hypothesis 1), and RQ3/Hypothesis 3, but participation attrition across measures resulted in insufficient sample size to detect correlations at .80 statistical power for exercise motivations and readiness for change (RQ2/Hypothesis 2). Implications for the data and results of this study are addressed in the discussion.

Participants' demographics, past and present exercise behaviors, perspectives on exercise motivation, current exercise stage of change, and exercise identity were measured using electronic versions of the following measures: Basic Demographics Questionnaire (BDQ), Godin Leisure-Time Physical Activity Questionnaire (GLTPAQ. Godin & Shephard, 1985), Stanford Brief Activity Survey (SBAS; Taylor-Piliae et al., 2006), Exercise Motivation Scale (EMS) (Li, 1999), and University of Rhode Island Change Assessment - Exercise 2 (URICA-E2) (Reed, 1995). The data from these surveys were obtained via SurveyMonkey (an online data collection resource). To answer all proposed research questions, data were analyzed utilizing descriptive statistics, analyses of variance, correlations, and multiple regressions.

For participants to proceed through the questionnaire, they needed to electronically sign the informed consent, including acknowledgment of the voluntary component of their participation. Additionally, all participants were informed of the purpose of the study before choosing whether or not to participate. An explanation of study purpose and informed consent form preceded all survey measures, and no deception was utilized.

Upon completion of the informed consent, participants completed the BDQ. The BDQ contained questions pertaining to participants' age, gender, ethnicity, education level, major, athletic affiliation, music/performing arts program affiliation, and physiological measurements. Following the BDQ, participants completed the four exercise-focused surveys: the GLTPAQ, SBAS, EMS, and URICA-2 to assess their perceptions on exercise behaviors and related benefits and barriers. Upon completion or discontinuation of participation, participants were thanked for their efforts and reminded of the contact information for further questions or to inquire about the results of the study upon completion of the manuscript.

Measures

The four exercise-focused instruments utilized for this study are detailed below. These instruments were selected to quickly and efficiently obtain several components of exercise self-report data, and lessen the likelihood of incomplete surveys, discontinuation of participation, and improve response rate.

Godin-Shephard Leisure-Time Physical Activity Questionnaire (GLTPAQ. Godin & Shephard, 1985). The GLTPAQ is a short, 4-item measure of leisure-time physical activity. Participants reported the number of times in a given week they engaged in strenuous, moderate, and mild exercise. On the final item, they rated how often on a 3-point Likert scale (Often [1], Sometimes [2], Rarely/Never [3]) they engaged in these activities long enough to sweat and increase their heart-rate. When scoring the questionnaire, frequencies of strenuous, moderate, and light activity were multiplied by 9, 5, and 3, respectively. By design, scores are multiplied to correspond with estimated metabolic equivalents (METs) for the respective level of leisure activity. The sum of those weighted scores resulted in the weekly leisure score index (LSI).

According to Godin and Shepard's (1985) original results, the LSI explained 58% of variance in body fat percentage and VO_2 max, maximal oxygen uptake during peak exercise. In strenuous exercisers, LSI scores were positively correlated with VO_2 max function, and inversely correlated with percentage of body fat (BF). Of strenuous exercisers, 80% of their weekly leisure scores corresponded with their expected VO_2 max, and 88.5% of their scores corresponded with expected. In other words, they were honestly self-reporting their activity levels, as reflected in markers of physical fitness. Test-retest reliability for the measure was .74 in its initial validation (Godin & Shepard, 1985) and .80 in a subsequent study of 10 frequently researched physical activity questionnaires (Jacobs, Ainsworth, Hartman, & Leon, 1993), with

greater reliability denoted for the reporting of moderate-vigorous over light activity levels. Cronbach alpha (internal consistency) was rarely reported in the literature but was ascertained as fair (α = .64) in a recent Turkish study (Sari & Erdoğan, 2016). To date, no study examined music student samples. For the current study, fair internal consistency was found to be α = .69, which is consistent with existing research and acceptable for exploratory research (Hair et al., 2010).

The GLTPAQ showed initial validity as a method for classifying or grouping participants based on the LSI. Over the past three decades, medical researchers (Amireault & Godin, 2015; Amireault, Godin, Lacombe, & Sabiston, 2015; Casey et al., 2017: & Sari & Erdogan, 2016) adopted the survey to define and group participants based on exercise behaviors. In a recent systematic review of 212 oncology studies utilizing the GLTPAQ (Amireault et al., 2015), the authors confirmed the GLTPAQ is a valid and reliable measure for ranking/grouping physical activity level and for identifying the determinants of physical activity behaviors in participants. However, nearly 82% of the studies modified the GLTPAQ to include additional self-report physical activity data, and the authors encouraged future studies to use the LSI as originally intended.

Stanford Brief Activity Survey (SBAS. Taylor-Piliae et al., 2006). The SBAS is a two-item self-report measure designed to efficiently assess the frequency and intensity of daily physical activity engagement. Item one on the survey asked participants to identify level of occupational or on-the-job activity. Item two asked participants to determine their exercise engagement level in their leisure-time. On both items, participants referred to descriptions of ascending activity frequency and intensity, ranging from mostly sedentary or physically idle

daily activities to at least five days per week of regularly strenuous job tasks or exercise programs.

According to Taylor-Piliae and colleagues (2006), a simplified scoring method should be utilized to determine a participant's level of activity. On a five-by-five grid, participants' on-the-job activity selection was paired with leisure-time activity. Every combination of job and leisure activity was reliably and independently rated by investigators to estimate the Metabolic Equivalent (MET). METs are an estimate of how many multiple equivalents of resting oxygen uptake would be required to engage in the activity, with higher METs indicating more intense and challenging exercise or physical activity (Ainsworth et al., 1993). Estimated METs were grouped into the following five interval categories of ascending level of exercise: inactive, light-intensity (2.0-3.9 METs), moderate-intensity (3.0-4.9 METs), hard-intensity (5.0-6.9 METs), and very hard-intensity (>6.9 METs) (Ainsworth et al., 2011).

The SBAS was initially validated with men and women 60-69 years, as categorizations of of higher SBAS activity levels significantly related to improvement on common markers of fitness, with sensitivity ranging from .73-.75 and specificity .58-.61 (Taylor-Piliae et al., 2006). These biomarkers and indicators of physical health and fitness included: minutes of physical activity per week recalled, kilocalorie energy expenditure per day, body mass index, high-density (good) cholesterol, fasting glucose, fasting insulin, and frequency of metabolic syndrome diagnoses. The authors validated this measure as an index of global activity but is less useful to determine the patterns of people's exercise engagement over time. Cronbach alphas have not been reported in the original or follow-up studies. For the current study the calculated Cronbach alpha level ($\alpha = .67$), was in the acceptable range for exploratory research (Hair et al., 2010).

Exercise Motivation Scale (EMS. Li 1996 [unpublished doctoral dissertation] & Li, 1999). Using Deci and Ryan's (1985) self-determination theory as a foundation, the EMS is a 31-item self-report designed to measure people's exercise experience as it relates to three basic tenets of motivation: amotivation, intrinsic motivation, and extrinsic motivation. Furthermore, exercise behaviors are causally determined a progressive continuum of extrinsically- to intrinsically- generated motivation: amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, intrinsic motivation to learn, intrinsic motivation to accomplish tasks, and intrinsic motivation to experience sensations (Deci & Ryan, 1991). Li (1999) discovered measures of motivation were predominantly geared towards athletes and motivation for sport-specific participation, as with the Sport Motivation Scale (SMS) (Pelletier et al., 1995). Based on this need for a general scale of exercise motivations, Li (1996, 1999) conducted several studies to develop the EMS, confirm its factor structure, and determine its construct validity.

Li (1996) psychometrically evaluated the EMS using College-aged samples (n = 371, 598) sampled from exercise classes completed the EMS. Li outfitted the EMS with a 6-point Likert scale ranging from 1 'Strongly Disagree' through 6 'Strongly Agree' for each item, ensuring respondents could not select the 'Neither Disagree or Agree' non-committal response. The SDT-derived 8-factor model provided a statistically significant goodness-of-fit; χ^2 (406, N = 371) = 940.79, $p < .001$ (Li, 1999). Three items for amotivation, four items per extrinsic motivation subscale (external regulation, introjected regulation, identified regulation, and integrated regulation), and four items per intrinsic motivation (IM) subscale (IM to learn, IM to accomplish tasks, and IM to experience sensations). All statistically significant factor loadings exceeded a minimum of .59, with an average of .71 and maximum value of .88. A simplex

model was used to test the construct validity of the EMS as it relates to self-determination theories hypothesized linear progression. Goodness of fit was demonstrated (χ^2 (204, N = 592) = 726.94, $p < .001$), with each adjacent motivational construct correlating expected (Li, 1996, 1999), from amotivation through intrinsic motivation to experience sensation.

The EMS demonstrated acceptable reliability, with Cronbach alphas averaging .77, in a range from a low of .71 (IM to accomplish) to a high of .85 (IM to learn), and test-retest reliability of .82 (Li, 1999). The reported statistics supports Li's (1996; 1999) work to develop a psychometrically sound instrument. Wininger's (2007) more recent psychometric analysis of the EMS echoed the acceptable levels of internal consistency reliability above the minimum of .70 for external, introjected, and identified regulation, and above .80 for amotivation, integrated regulation, and the three intrinsic motivation scales. For the current study, acceptable internal consistency was found to be $\alpha = .75$, which corresponds with existing research.

It is of note that Wininger (2007) utilized summed subscale scores, with a range of 4-24 on the four-item extrinsic and intrinsic motivation subscales, and 3-18 for the three-item amotivation subscale. Wininger assessed for validity by correlating EMS summed scale scores with other scales and voluntary exercise behaviors. His methodological approach provided a framework for the current study's protocol for analyzing self-reported exercise behavior, motivation, and readiness for change.

University of Rhode Island Change Assessment - Exercise 2 (URICA-E2. Reed 1995; adaptation of URICA-E. Marcus et al., 1992;). Prochaska's Transtheoretical Model (TTM) of change, originally designed for integrated treatment of addiction (Prochaska & DiClemente, 1986), has been adapted for a variety of health behaviors, including exercise (Prochaska & Velicer, 1997; Prochaska, 2013). Prochaska's TTM comprises the following five stages of

change: Precontemplation, Contemplation, Preparation, Action, and Maintenance. Using TTM as a conceptual framework, McConnaughy and colleagues (1983; 1989) designed the University of Rhode Island Change Assessment (URICA) to measure stage of change in psychotherapy. Since then, the URICA has been adapted for stage of change measurement in a variety of contexts, including: domestic violence (Levesque, Gelles, & Velicer, 2000), general addictions (DiClemente, et al., 2004), alcoholism (DiClemente & Hughes, 1990), and harm-reduction for alcohol use (Soderstrom et al., 2007).

The measure used in the current study, the URICA-E2 (Reed, 1995), is the third revision of the URICA-E (Marcus et al., 1992; Reed, Velicer, Rossi, & Marcus, 1993) designed to assess exercise stage of change. Following its initial development, Reed (1995) developed the URICA-E2, which updated the TTM to include two facets of Preconcemplation: Non-Believer and Believer. Across all subscales, strong internal consistence was demonstrated, with Cronbach alphas ranging from .81 to .94 and only Pre-contemplation (Non-believer) and Preparation scales falling into the .80-.89 range (Reed 1995). To date, no study examined music student samples. For the current study, fair internal consistency was found to be $\alpha = .64$, which is lower than existing research, but within acceptable ranges for exploratory research (Hair et al., 2010).

When scoring and interpreting the URICA-E2, results using standardized scores are called Profile scores, and they can be directly compared to the six-factor model and seven exerciser profiles (i.e. Precontemplation-Nonbeliever, Precontemplation-Believer, Contemplation, Action, Maintenance, and Ambivalent [inconsistent responding profile]). These profile scores are ideal for use in individualized intervention and therapeutic evaluation, not for group consulting or large sample studies. With parsimony in mind, DiClemente, Schlundt, and Gemmell (2004) developed an alternative single readiness score for the 24-item URICA-E2.

Mean subscales for Contemplation, Action, and Maintenance are summed and the Precontemplation subscale means are subtracted from the CAM total (i.e., [C+A+M] - [PC] = Readiness Score). The resulting number is the Readiness Score. Using the means for scoring purposes is ideal for understanding change readiness in study samples or across small groups (DiClemente, et al., 2004). In the current study, the Readiness Score and Subscale scores were utilized during all data analysis and comparisons across measures to assess for the influence of behavior changes stages contrasted with overall readiness for change.

Data Analysis

To determine the demographic profile of the sample and ascertain comparison groups, descriptive statistics were obtained through the Basic Demographics Questionnaire (BDQ). In order to address all research questions, BDQ data were obtained to create music and non-music major comparison groups. Wherein sufficient sample sizes were obtained for sub-groups of interest (i.e. music performance and music theory/education majors and graduate students and undergraduate students in sample), these groups were used to repeat analyses across all research questions. Although the research questions did not specifically inquire or hypothesize about the influence of social identity (e.g. gender, race, age, sex identity) differences in exercise behaviors and perceptions, these demographic groups were established in the sample. Data were analyzed to assess possible differences between and within groups related to social identity, as to inquire about their impact on general college student and music major self-report data.

Additionally, participants were asked about their height and weight at the time of survey to aquire data necessary to calculate their Body Mass Index (BMI). BMI is calculated as a result of a person's weight in kilograms divided by their height in squared meters. BMI is moderately correlated with more direct measures (i.e., bioelectric, underwater, x-ray technologies) of body

fat, and BMI's in excess of 25.0 (denoting high body fatness) is reliably correlated with morbidity and mortality outcomes critical to those living a less active and more sedentary lifestyle (see the literature review chapter of this dissertation). There were no hypothesized trends and associations regarding sample BMI characteristic for this study, but implications for this data are discussed in the concluding chapter of this dissertation.

To address differences between non-music and music majors' self-reported exercise behaviors (RQ1/H1 - as measured by GLTPAQ and SBAS), a global effects multiple analysis of variance (MANOVA) was conducted. To determine differences between music and non-music majors' exercise motivations and readiness for change (RQ2/H2 - as measured by EMS, URICA-E2), a global effects MANOVA was conducted. To evaluate RQ3, how well music students' exercise motivations and readiness for change (as measured by EMS, URICA-2) predict self-reported exercise behavior (as measured by GLTPAQ and SBAS), two multiple linear regressions were conducted. For both regressions, participant motivational subscales were entered simultaneously on Step 1, followed by change readiness subscales on Step 2. Bivariate and part correlations were analyzed.

CHAPTER III: RESULTS

Prior to exploring research questions and correspondent hypotheses, analyses of academic and sociocultural demographics outside the scope of the hypothesized relationships were conducted to detect between and within group differences. There were no significant differences between the self-reported weekly exercise, leisure activity, and global physical activity behaviors across the following participant categories: SES, undergraduate/graduate status, birth sex, performance and non-performance music major concentrations, and race/ethnicity. Due to the homogeneity of the sample, within group analyses were not conducted for race/ethnicity, sexual orientation, and gender identity. The results of these precursory analyses indicated there were no significant differences for academic or sociocultural demographic groups outside the hypothesized group relationships.

Music Students' Self-Reported Exercise Behaviors (RQ1/H1)

Upon examination of RQ1, music students reported engaging in significantly less leisure activity (PAQ LSI. $F = 5.10$, $p<.05$; SBAS-leisure. $F = 6.04$, $p<.05$) and global physical activity (SBAS GAL. $F = 4.54$, $p<.05$) relative to non-music students. Within these measures, music students reported engaging in significantly less moderate intensity exercise (PAQ MOD. $F = 4.17$, $p<.05$). There were no significant differences in self-reported weekly exercise frequency over the past 3 months (7-Day Ex-Freq. $F = 1.15$, $p=.29$) between music students ($M = 2.87$, $SD = 1.54$) and non-music students ($M = 3.10$, $SD = 1.58$), with each group engaging in exercise activities three times weekly. There were no significant differences in strenuous exercise (PAQ STREN.) between music students ($M = 1.60$, $SD = 1.82$) and non-music students ($M = 1.88$, $SD = 1.96$). Both groups reported engaging in strenuous leisure exercise fewer than two days weekly. These results provided some support for H1, in that music students were less likely to

report engaging in moderate exercise behaviors and reported less overall leisure and global activity levels. These data did not support H1 in relation to vigorous/strenuous physical activity. Related to, but outside the scope of H1, music majors had significantly higher BMIs (M = 27.41, SD = 10.63) than non-music majors (M = 24.09, SD = 5.60). These implications are addressed in Chapter IV. The complete data set and analyses used for RQ1/H1 can be found in Table 3.

Music Students' Motivations and Readiness for Exercise Behavior Change (RQ2/H2)

In relation to RQ2, music students endorsed stronger Amotivation (F = 8.21, p<.01) perceptions than non-music students. On the self-determined extrinsic motivation scales, music students made weaker endorsements than non-music students for identified regulation (F = 5.38, p<.05) and integrated regulation(F = 3.87, p=.05). Music students made weaker endorsements than non-music students on the IM to Experience Sensation scale (F = 5.15, p<.05). See Table 4 for complete RQ2/H2 data and corresponding inferential statistics. For the remaining IM scale, there were no differences between music and non-music students (IM to learn. F = .12, p=.73; IM to Accomplish. F = 2.38, p<.12). There were no differences between music and non-music students' readiness for exercise behavior change (F = 1.71, p<.443); however, music students made stronger endorsements on the precontemplation subscale than non-music students (F = 5.15, p=.05). The data provided some support for H2, in that music students endorsed fewer self-determined motivations and more precontemplation statements, an indicator of lacking readiness for behavior change. These data did not support H2 in regard to the prediction that music students would display a lower overall readiness for behavior change.

Predicting Music Students' Exercise and Physical Activities (RQ3/H3)

Prior to answering RQ3 and testing H3, bivariate correlations were first calculated. Table 5 details means, standard deviations, and bivariate correlations between the study's two

independent variables of (Motivation: EMS Subscales; Readiness for Change: URICA-E2 Subscales) and the first dependent variable, weekly exercise behavior over the past three months (7-Day Ex-Freq). Table 6 provides descriptives and bivariate correlations between the independent variables and the second dependent variable, self-reported weekly leisure exercise frequency/intensity (PAQ LSI). Table 7 displays the descriptive statistics and bivariate correlations between the independent variables and the final dependent variable, global physical activity level (SBAS GAL). Across each regression analysis, the index score URICA Readiness, which calculates participants' overall readiness for exercise behavior change, violated multicollinearity tolerances and was excluded from analyses. The five URICA-E2 subscales were retained for the multiple regression analyses, focusing the examination on the impact of behavior change readiness aspects used to compute the overall readiness score.

The first linear multiple regression performed examined if participants' motivation (EMS) and readiness for change (URICA-E2) predicted self-reported exercise frequency over the past 3-months (7-day Ex-Freq). The eight EMS subscales were entered simultaneously in Step 1 and the URICA-E2 subscales followed in Step 2. As illustrated in Table 8, the linear combination of motivation and change readiness variables, a total correlation coefficient of .66, significantly related to weekly exercise frequency over the past three months. The Step 1 correlation coefficient was .46, indicating motivations explained 21% of the variance ($R^2 = .21$, $F(8, 171) = 5.82$, $p < .001$), with change readiness contributing an additional 22% of total 43% variance explained ($R^2 = .43$, $F(5, 166) = 12.48$, $p < .001$). Integrated Regulation (EMS Subscale) and Maintenance (URICA-E2 Subscale) yielded significant part correlations, $r_{part} = 1.78$, $p < .01$ and $r_{part} = .23$, $p < .001$, respectively (See Table 9). The results of this regression analysis support H3, suggesting that music students with stronger motivations, especially self-

directed extrinsic motivations, and change readiness, especially in behavior maintenance, exercised more frequently over the past three months.

The second linear multiple regression examined the impact of motivation and change readiness variables on overall leisure exercise levels (PAQ LSI). The linear combination of motivation and change readiness, a total correlation coefficient of .45, significantly related to overall leisure activity levels (See Table 8). The Step 1 correlation coefficient was .31, indicating motivations explained 10% of the variance ($R^2 = .10$, $F(8, 173) = 2.36$, $p < .05$), with change readiness contributing an additional 10% of total 20% variance explained ($R^2 = .20$, $F(5, 168) = 4.19$, $p < .001$). As depicted in Table 10, Maintenance (URICA-E2 Subscale) yielded one significant part correlation ($r_{part} = .21$, $p < .001$). The results of this regression analysis support H3, suggesting that music students with stronger motivations and change readiness, especially behavioral maintenance, reported in engaging more overall leisure exercise activity.

The final linear multiple regression examined the impact of motivation and change readiness variables on global physical activity levels (SBAS GAL). The linear combination of motivation and change readiness, a total correlation coefficient of .73, significantly related to global physical activity levels (See Table 8). The Step 1 correlation coefficient was .56, indicating motivations explained 31% of the variance ($R^2 = .31$, $F(8, 175) = 9.96$, $p < .001$), with change readiness contributing an additional 23% of a total 54% variance explained ($R^2 = .54$, $F(5, 170) = 16.55$, $p < .001$). As depicted in Table 10, Integrated Regulation (EMS Subscale) yielded a significant part correlation ($r_{part} = .15$, $p < .05$), as did Maintenance (EMS Subscale) ($r_{part} = .24$, $p < .001$). The results of this regression analysis support H3, suggesting that music students with stronger motivations, especially integrated regulation, and change readiness, especially behavioral maintenance, reported in engaging more global physical activity.

CHAPTER IV: DISCUSSION AND CONCLUSIONS

Initial descriptive and inferential statistics for this study revealed a homogenous participant sample that engaged in infrequent, prolonged, moderate-vigorous intensity exercise (twice per week for at least 30 minutes) and frequent, short, light-intensity physical activity (daily 15-minute bouts – commonly walking to and from class). The inactivity of the sample is not surprising, as young adult populations typically fail to meet the prescribed federal standard: 5 days per week of at least 30 minutes of moderate-vigorous physical activity or exercise (Clarke, Norris, & Schiller, 2017; Haskell et al., 2007; Pate et al., 1995). This sample was no exception, as there were no significant differences in activity levels across sociocultural demographic groups or overall academic status. These results are consistent with college populations, as they underutilize campus recreation services (Forrester, 2014) and mirror national trends of increasingly sedentary behaviors across the lifespan (Centers for Disease Control and Prevention, 2011; National Physical Activity Plan, 2016).

In the broadest sense, college students and the general population struggle equally with engaging in consistent, healthy rates of physical activity. This is precisely why within-sample differences in this study between music and non-music majors are so elucidating. Public health researchers ubiquitously refer to the RE-AIM (reach, effectiveness, adoption, implementation, maintenance) model (Glasgow, Vogt, & Boles, 1999) for best practices and examination of the difficulties of enacting change at population level. There exists an inherent tradeoff for population scale interventions: they have expansive reach but are far more limited in effectiveness within population sub-groups. Community-based programs by-design select narrower targets to have more impact at a smaller group level. Especially with regard to positive health behaviors (e.g. smoking cessation, alcohol use harm reduction, weight management, and

exercise), tailored, multi-level interventions yield more lasting impact in real-world settings as the health and lifestyle concerns of populations vary for their subgroups (Glasgow, Klesges, Dzewaltowski, Estabrooks, & Vogt, 2006). From this perspective, music students' health behaviors become nested in the larger collegiate population, and their real-world, rarely studied concerns need to be addressed with more tailored intervention. Framed around the three research hypotheses, this chapter examines differences in the study's data, provides insights into music major well-being, and explores implications that may bolster future research and improve health behavior change interventions.

Music Students' Self-Reported Exercise Behaviors (RQ1/H1)

Regardless of major, mild exercise was the most cited form of physical activity, which included fast walking (frequent, daily commuting to and from class) and light jogging. An array of recreational sports and fitness classes were endorsed infrequently. The latter activities corresponded with strenuous exercise, of which there were no differences between the comparison groups, about two days per week. Music and non-music majors also showed no difference in prolonged exercise (3 days/week), brief mild exertion exercise (4 days/week), and work activities (i.e. easy walking, light chores, work involving minimal exertion, mostly seated work). Over 80 percent of the sample fell short of the recommended 5 days of prolonged moderate-strenuous physical activity, a profile that reflects national and collegiate trends. On average, fewer than 20% of 18 to 24 year-olds meet the federal guidelines for aerobic and muscle strengthening activity (Clarke, Norris, & Schiller, 2017).

Participants' overall leisure activities, the leisure score index (LSI), highlighted a glaring inconsistency contrasted with 7-day exercise frequencies. On average, participants scored in the 'active' category for their LSI, but with considerable deviation. Sixty-eight percent of

participants considered themselves active based on LSI, engaging in at least 15 minutes of leisure activity anywhere from three times per week to nearly 20 times per week. This high variability corresponds with participants reporting walking as their primary mode of leisure activity. In other words, the sample frequently endorsed brief, mild-moderate activity due to their daily commute to and from classes. This environmental demand remains insufficient to produce activity intensities recommended for their health. Additionally, this role-specific demand is temporary, disappearing when college students graduate.

Although the study sample was predictably, insufficiently active, the most illuminating differences were observed between music majors' and non-music majors' moderate exertion activities and LSI, providing support for H1. Music majors reported significantly less moderate-intensity leisure activity, a critical difference, considering it is the sample's primary mode used to get their recommended weekly exercise. Music majors were even less likely than non-music majors to engage in enough moderate exercise to make up for infrequently engaging in strenuous exercise. To boot, music majors' LSIs were significantly lower than non-music majors. All participants failed to exceed the threshold for recommended physical activity, but music majors were even less engaged in moderate exertion exercise and overall leisure activities.

Results of this study suggest the emergence of unique vulnerabilities, as music majors report fewer overall brief leisure and moderate exertion activities, which are more accessible and require less physical investment than prolonged strenuous activities. In a recent study of college students perceived barriers to exercise, complaints of insufficient energy, time and willpower were predominant obstacles to exercising regularly, but there were no differences between men and women or traditional versus non-traditional students (Ball, Bice, & Maljak, 2018). However, music majors endorsed significantly lower confidence than non-music majors in

regard to overcoming these primary barriers to regular exercise (Seitz, 2017). In the qualitative portion of Seitz (2017) study of music majors' exercise identity and motivations, participants frequently referenced their demanding, time-consuming practice schedules and auditioning requirements as a unique element limiting their ability to engage in regular, prolonged exercise. As this study suggests and recent research supports, music majors may view any leisure activity as more taxing and less viable than other college student demographic groups.

This study measured some early adverse consequences of music majors being significantly less active, as they averaged a significantly higher, overweight BMI contrasted with non-music majors' normal range BMI. Longitudinal weight maintenance research indicates the average individual will continually accrue about 2% in their total body fat percentage per decade throughout their adult life, with the greatest change, about 5% increase, occurring in their 20s and 30s (Imboden, Welch, Swartz, Montoye, Finch, Harber, & Kaminsky, 2017). The college student population, by virtue of their age, is entering a critical decade for establishing better health habits and overcoming this trend of unhealthy increases in body fat. Interventions with music students could ideally target behavior changes most relevant to their habits, such as increasing duration of leisure activity to 30-minutes-or-more and engaging in more frequent moderate intensity exercise. Specific attention would likely need to be paid to barriers music majors endorse to engaging in more prolonged and moderate intensity activities. Continued examination of habits and activity motives will be critical to providing a clearer picture of vulnerabilities and opportunities unique to college students, especially music majors.

Given their student role requires substantial sitting time, college students have a sedentariness risk factor, making it even more critical to use their leisure time to exceed the 30-minute benchmark for moderate-vigorous exercise. Unfortunately, previous studies illustrate

people's tendency to over-report their levels of physical activity compared to accelerometer data (Dyrstad, Hansen, Holme, & Anderssen, 2014; Troiano et al., 2008). As such, it is likely this sample over-reported the frequency of 30-minutes-or-more exercise and their shorter-lived mild leisure activity. Worse so, Forrester's (2014) analysis concluded students across the nation underutilize campus recreation resources. The campus environment, despite efforts to provide ample campus recreation and fitness resources, is not conducive to students engaging in regular, healthy levels of physical activity. If opportunity alone is insufficient to produce healthy results in college students, and music majors are uniquely vulnerable to inactivity and corresponding signs of deteriorating health, then interventions need to target the processes that positively influence healthy behavior change.

As people yield to more sedentary behaviors over time, it illustrates a societal disinclination to exercise. College students, like many with desk jobs, encounter a significant environmental barrier: their workplace (e.g., classrooms, libraries, rehearsal studios, laboratories, lecture halls) institutionalizes sedentariness. Whether they sit for long periods studying in the classroom or elsewhere, being a college student is a largely physically inactive occupation. This is why it is critical to examine differences between groups to better understand specific vulnerabilities to target high-impact opportunities, like motivation and readiness to enact positive health behavior change.

Music Students' Motivations and Readiness for Exercise Behavior Change (RQ2/H2)

The aims of H2 were to investigate the theoretical components of behavior change thought to be essential: motivation and readiness for change. The strength and direction of the psychological pressure a person applies to change is best amplified and sustained by internally generated motives (Deci & Ryan, 2008). Results from this study indicate music majors endorse

a weaker motivational profile than non-music majors. When asked about their motivation to exercise, music majors endorsed more amotivation statements, indicating non-music majors may be more flexible and apt to change their exercise behaviors. Absence of motivation is the greatest detractor from developing self-determined motives and subsequent exercise behavior change (Emm-Collison et al., 2020; Hannan et al., 2019). Emm-Collison and colleagues (2020) surveyed over 2500 parents and found amotivational profiles were more fixed; those individuals were less likely to develop self-determined motives and engage in exercise across time.

With regard to extrinsic motivation – change drive typically derived from sources outside the person – music majors made weaker endorsements for identified and integrated regulation. Deci and Ryan (2008) identified these motivations as essential for the eventual development of intrinsic motivators, as they embody the process of personalizing external standards and values. Of the six most common motivational profiles, transitional profiles involve predominantly extrinsic motivators as a person attempts to develop their intrinsic drives (Emm-Collison et al., 2020). By definition, these individuals are in flux, fluid in their perspectives, with participants reporting increased levels of activity and likelihood to transition to more intrinsic motivation profiles (2020). SDT and motivational profile research maintain identified and integrated motivation as critical for behavior change. With weaker identified and integrated regulation scores, music majors seem to lack the transitional quality of profiles more amenable to exercise behavior change.

Finally, music students made weaker endorsements than non-music students on the intrinsic motivation to experience sensation scale, providing some support for H2. Music majors were less intrinsically motivated by exercise to simply feel the correspondent sensations. Results from this study revealed music majors may need more than the presence of university exercise

facilities to entice changes in their exercise behaviors. The opportunity to feel sensations from exercise may not be sufficient for this subgroup. Recent research challenges the perspective that explicit motives are essential for change. Hannan et al. (2019) used the implicit association test to determine how participants' tendencies impacted responses to approach or avoidance exercise cues. They identified a trend wherein frequent leisure-time exercisers endorsed more automatically motivated responses, an approach bias towards exercise. In other words, those with a history of exercising regularly made positive automatic attributions about future exercise opportunities. If music majors are less likely to engage with exercise through self-determined motivations, cultivating an implicit readiness for exercise behavior change may be that much more important.

Music majors and non-music majors saw no difference between their change readiness scores; however, music majors made stronger endorsements of precontemplative statements. Precontemplation is a stage of behavior change marked by an absence of thought, consideration, or willingness to engage any aspect of the change process (Prochaska & Velicer, 1997). Amotivation and precontemplation are correspondent constructs across these complementary theories, emblematic of psychological barriers to health behavior change. Music majors endorsed these characteristics more than their non-music major counterparts, putting them at greater risk of abandoning exercise before they even consider picking up the habit.

Predicting Music Students' Exercise and Physical Activities (RQ3/H3)

The aim of H3 was to determine if, as hypothesized, participants more self-determined motives and strong readiness for change would predict more frequent and strenuous exercise behaviors. First, 43% of the variance was explained by motivation and readiness variables for frequency of exercise over the past 3 months, with integrated regulation and maintenance as

significant part correlations. Again with maintenance as a significant part correlation, 20% percent of variance for leisure activities (LSI – typically walking to and from class for this sample) was explained by motivation and readiness scales. Lastly, 54% percent of variance in music students' global activity level (GAL - work and leisure activities combined, wherein students are inherently sedentary) was explained by motivation and readiness scale scores. Again, integrated regulation and maintenance were significant part correlations. Integrated regulation is the motivational aspect of a person that serves as a segue to intrinsic motivation being developed, wherein extrinsic values (e.g., body norms, fitness standards, exercise trends) to exercise become accepted as personal. Maintenance perspectives reflect a person who has integrated health behavior actions as a part of their daily routine, a lifelong, fluctuating stage for disciplined exercisers.

Music majors who endorsed integrating extrinsic motives for exercise and made stronger maintenance statements were predictably more active in their exercise behaviors, overall leisure activities, and global activity levels. These results demonstrate music majors are impacted by the more self-determined extrinsic motivators. These results correspond with Seitz's (2017) finding that music majors do not have a strong sense of exerciser identity. The implication here may be that music majors are still developing their exerciser identities. As college students, they maintain for months and possibly years their walking commuter behaviors and brief, moderate bouts of exercise. These maintenance behaviors, as previously discussed are insufficient and fleeting after graduation. Without moving their motivational profiles forward beyond amotivation and precontemplation, they may likely fall in line with national sedentariness and obesity trends. But in their motivations lies the opportunity, as integrated motivation is the theoretical gateway to intrinsic motivations that can help sustain exercise behavior change.

Implications and Conclusions

This study and the literature base at large illustrate a college student population that does not uniquely benefit from having integrated campus fitness resources, as their levels of physical activity attests. For music majors, it seems they struggle more than other students with the stuck mentality of amotivation and precontemplation, which stagnates the development of more facilitative motives for exercise. Recent research in public health posits the scope of an intervention is but one, limited component of impactful interventions. The collective wisdom points toward the necessity of socially interactive, culturally competent, environmentally tailored, multi-level interventions, often illustrated by the RE-AIM Model (Barton, 2012; Glasgow et al., 1999).

Given the massive undertaking that is delivering excellent public health interventions, it is unlikely wholesale campus recreation programming will effectively reach music majors as an underserved subset. If Forrester's (2014) recent campus recreation study is any evidence to support this claim, interventionists and public health initiatives are failing to effectively reach even the normative swath of an increasing sedentary collegiate population, let alone music students. As campuses already possess the reach, the basic infrastructure, and the available resources, it is critical then to embed tailored interventions and outreach to have a greater impact on the specific issues with which music majors contend.

Based on the results of this study, amotivation to exercise is the foremost barrier, as it can interfere with integration of extrinsic motivation and development of intrinsic drive. In a recent study using a similar college population, Seitz (2017) found music majors are less likely to identify themselves as exercisers. One reason could be due to education-based cultural barriers fostering stereotypes of athlete or "jock" culture in which the performing arts becomes its

antithesis. It is likely interventions of the greatest impact will be aimed at disentangling exercise from student-athlete culture and instilling it as an approachable health behavior for all.

The emergent nuance and complexity of music majors exercise struggles may warrant conceptualizing the problem from individual behavior change and cultural perspectives. Jonathan Haidt introduced the metaphor of the elephant-rider-path to emphasize the importance of the respective motivation, cognition, environment triad in enacting and maintaining changes in behaviors and viewpoints (Konukman et al., 2012). The current study's results illustrate the undeniable impact of individual motivation (elephant), or amotivation, on exercise behavior change. A thoughtful, knowledgeable student (rider) in an unobstructed environment (path) will likely still fail to sustain healthy behavior changes without a constellation of intrinsic motives. Future research and intervention need to better articulate motivational profiles and examine the specific environmental needs of small, understudied populations like music students.

At the systemic level, public health interventions inequities reveal elucidative trends. Typically, the wealthiest and most privileged members of a community garner the benefits of effective outreach, an inverse equity hypothesis (Victora et al., 2018). In exercise behavior change terms: healthier, more active, less obese, in-group students with social capital (e.g., young, able bodied, male, student-athlete who lives on campus) would be more likely to adopt regular utilization of campus fitness resources. The more successful the intervention is with these early adopters, the more underserved groups of under-utilizers (e.g., music students), the ones at greatest need and subsequent risk, are left behind. Future research may benefit from utilizing participatory action research (Tetui et al., 2018) to access the deeper, context-rich insights won from more collaborative approaches to working with study participants. Unique demands and needs of underserved populations emerge more readily using these methods of

inquiry, which could inform more effective interventions to bolster exercise adherence and sustain behavior change motivation in music students.

From an institutional perspective, Music schools have also pledged themselves to attend to the health needs of their students (NASM, 2017). It would behoove music schools to adopt a culture of health, including reinforcing to students their craft as performers is a uniquely, physically active one. A more widely known approach would be to connect exercise to the training of resilience and music skills integral to music programs (i.e., handling the pressure of high-stakes auditions, improving lung capacity to produce stronger, longer-held notes, strengthening muscles for marching artists). Another less apparent but equally useful tool would be to simply harness the placebo effect. Crum and Langer (2007) conducted a study with housekeepers, half of whom were told their occupational activities met federal standards for daily physical activity. Four weeks later, the half who received this acknowledgement had lower body weight, blood pressure, body fat, hip-to-waist ratio, and body mass index. To utilize the placebo effect, music schools may only need to make frequent, brief acknowledgements of their students unique training demands (e.g., walking to classes carrying a tuba or upright bass, standing for hours rehearsing, repetitive fine motor stress). This could be an effortless first step toward creating a culture of exercise in music schools, even if that start employs the placebo effect.

The current study, though replete with evidence meriting further investigation and intervention, is not without limitations. An initial and surprising limitation involved the rapid deterioration of consistency within participant responses. A small amount of data was lost simply from students who began the survey and did not conclude. This may be indicative of a common issue keeping participants engaged with online surveys, no matter how brief. It is

recommended future research engage w/measures that can be automatically tracked (i.e., phone apps) or implemented during dedicated classroom time. Weaker internal consistency resulted from the measures used in this study, which may be indicative of the limited utility of self-report for exercise behaviors. With the advent of wearable technologies and tracking capabilities of most smart phones, future research could improve their methodological rigor if they designed more objective checks. Ecological momentary assessments are a modern form of measurement currently utilized in the physical activity and public health literature (Dunton et al., 2007), which could provide a valuable framework for future inquiry.

As with many dissertations, this study utilized a convenience sample of college-aged students from a predominantly white, middle class institution. Inherent in the ease of sampling on a single college campus are the drawbacks of a less than diverse population. Future researchers are encouraged to engage in collaborative research with scientists from other geographic locations, as pooling university samples may leverage the convenience of campuses with enhanced regional diversity. In addition, community-based samples of professional musicians may articulate the problem via cross sections of musicians across their careers. Following music students longitudinally would be ideal, but it is likely attrition rates would become untenable following graduation from their collegiate institution.

The data from this study, set in the landscape of the literature base, depicts music majors as a subset of college students vulnerable to adverse effects of weaker motivations, greater inactivity, and overweight BMI likely to worsen over time. Ardent public health, university, and exercise behavior researchers have the opportunity to contribute to a sparse literature base and pioneer an under researched domain of behavioral inquiry. Music schools are similarly, uniquely positioned to engage with research scientists, as they are gatekeepers to this underserved

participant pool. With a more collaborative approach to study informing target intervention programming, music students, research scientists, and music schools can all become beneficiaries of the insights of a truly meaningful line of psychological study.

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Appendices

APPENDIX A: TABLES

Table 1
Academic Demographics of Participants

Grouping Variable (*N* =214)	*n*	Percent of subsample
Collegiate Year (*n = 212*)		
Freshman	40	18.87
Sophomore	74	34.91
Junior	37	17.45
Senior	35	16.51
Masters	24	11.32
Doctoral	2	.94
Degree Pursued (*n = 214*)		
Undergraduate	188	87.85
Graduate	26	12.15
Academic Major (*n = 214*)		
Music	100	46.67
Non-Music	114	53.33
Music Major Type (*n* = 97)		
Music Performance	41	42.27
Music Education	32	32.99
Theory/Composition	24	24.74
Marching Artist (*n = 117*)		
No/Not Active	91	77.78
Yes/Active Participant	26	22.22
Student Athlete (*n = 214*)		
No/Not Active	201	6.07
Yes/Active Participant	13	93.93

Table 2
Sociocultural Demographics of Participants

Grouping Variable (*N* =214)	*n*	Percent of subsample	Additional Descriptive & Specifier Data	
Age in Years (*n* = 214)			*M*	*SD*
18-22	174	81.30	20.73	2.66
23-27	35	16.36	*min*	*Max*
28+	5	2.34	18	38
SES(*n = 211*)				
Working Class	40	18.96		
Lower-Middle Class	74	34.91		
Middle Class	37	17.45		
Upper-Middle Class	35	16.51		
Upper Class	24	11.32		
No Answer/Don't Know	2	.94		
Person of Color (*n = 211*)			Specifier Responses	
No	180	85.31	Ashkenazi, Asian/White (2), Black/White, Black/White/Native American, Chinese, Hattian-American, Indian American, Iranian/Polish, Italian/Polish, Korean, Kosovan/Albanian-American, Jewish, Mixed Caucasian, Multi-race/Mexican, White Hispanic/Latino (4), White Persian-American,	
Yes	31	14.69		
Race/Ethnicity (*n = 211*)				
Asian/Asian-American	12	5.69		
Black/African-American	6	2.84		
Hispanic/Latino	12	5.69		
Biracial/Multiracial	9	4.27		
White/Caucasian	167	79.15		
Other	5	2.37		
Sexual Orientaton (*n* = 211)			Specifier Responses	
Lesbian/Gay	18	8.53	(Lesbian = 4, Gay = 14)	
Bisexual	24	11.37		
Pansexual	6	2.84	Asexual (3), Asexual – Heteroromantic, Demisexual, Straight, "I don't understand the question and I won't respond to it"	
Queer	3	14.22		
Fluid	1	0.47		
Heterosexual	154	73.99		
Other	5	2.37		
Birth Sex (*n* = 210)				
Female	149	70.95		
Male	61	29.05		
Gender Identity (*n* = 209)			Specifier Responses	
Woman	147	70.33	Trans ID & Female Birth Sex (2) Transmasculine/possibly non-binary, Potato	
Man	60	28.71		
Gender Non-Conforming	2	.96		

Note. SES: Socioeconomic Status; ID: Identity

Table 3

Means, Standard Deviations, and Differences for Self-Reported Physical Activity-Related Measures

Measure/Indicator of Physical Activity	Non-Music Majors		Music Majors		MANOVA	
	M	*SD*	*M*	*SD*	*F*	*p*
BMI (*n = 210*)	24.09	5.60	27.41	10.63	8.29	.000**
7-Day Ex-Freq (*n = 209*)	3.09	1.58	2.87	1.54	1.15	.29
PAQ LSI (*n = 196*)	45.85	24.52	37.89	24.80	5.10	.03*
STREN	1.88	1.96	1.60	1.82	1.08	.30
MOD	3.19	2.44	2.45	2.61	4.17	.04*
MILD	4.33	3.17	3.75	3.51	1.47	.23
SBAS GAL (*n = 195*)	1.74	1.13	1.41	1.01	4.54	.03*
SBAS-work	1.91	.81	2.03	.71	1.22	.27
SBAS-leisure	2.52	1.29	2.09	1.20	6.04	.02*

Note. BMI: Body Mass Index; 7-Day Ex-Freq: Self-reported average weekly frequency of exercise in the past 3 months; PAQ LSI: Physical Activity Questionnaire Leisure Score Index (7-day); STREN: frequency of strenuous intensity activity; MOD: frequency of moderate intensity activity; MILD: frequency of mild intensity activity; SBAS: Stanford Brief Activity Survey; SBAS GAL: SBAS Global Activity Level; SBAS-work: SBAS on-the-job activity level; SBAS-leisure: SBAS leisure activity level.

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 4

Means, and Standard Deviations, and Differences for Motivation and Readiness for Change Measures

Measure/Indicator of Physical Activity	Non-Music Majors		Music Majors		MANOVA	
	M	*SD*	*M*	*SD*	*F*	*p*
EMS						
Amotivation	5.69	3.17	7.07	3.47	8.21	.01**
External Regulation	12.54	4.38	12.18	4.31	0.33	.57
Introjected Regulation	14.24	4.08	13.97	3.99	0.21	.65
Identified Regulation	20.11	3.61	18.98	3.09	5.38	.02*
Integrated Regulation	16.82	4.48	15.62	3.90	3.87	.05*
IM to learn	15.08	4.31	14.87	4.01	0.12	.73
IM to accomplish	17.80	3.84	16.95	3.74	2.38	.12
IM to Experience Sensations	18.18	4.03	16.91	3.59	5.15	.02*
URICA-E2 Readiness	7.08	1.02	6.82	0.97	0.59	.44
Precontemplation	2.36	0.90	2.60	0.81	3.81	.05*
Contemplation	3.55	0.99	3.66	0.84	0.64	.43
Preparation	2.70	0.95	2.63	0.75	0.37	.54
Action	2.93	1.02	2.99	0.97	0.22	.64
Maintenance	3.00	1.22	2.78	1.01	1.89	.17

Note. EMS: Exercise Motivation Scale; IM: Intrinsic Motivation; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure).

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 5
Bivariate Correlations for Self-Reported Weekly Exercise Frequency (DV – 7-Day Ex-Freq*), Motivation Subscales (IV -* EMS*), and* Readiness for Change Subscales *(IV –* URICA-E2*)*

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
7-Day Ex-Freq	2.97	1.55	-												
EMS Amotiv	6.39	3.40	-0.29***	-											
External Reg	12.50	4.30	-0.17**	0.32***	-										
Introj Reg	14.16	4.00	0.00	0.20**	0.63***	-									
Ident Reg	19.66	3.24	0.31***	-0.41***	0.03	0.28***	-								
Integ Reg	16.38	4.08	0.39***	-0.32***	0.03	0.39***	0.72***	-							
IMLearn	14.99	4.16	0.22***	-0.12	0.06	0.10	0.40***	0.49***	-						
IMAccom	17.36	3.84	0.34***	-0.34***	-0.05	0.21**	0.65***	0.75***	0.65***	-					
IMExp	17.68	3.76	0.38***	-0.35***	-0.08	0.14*	0.67***	0.67***	0.67***	0.81***	-				
URICA Precont	2.47	0.87	-0.51***	0.56***	0.25***	-0.08	-0.48***	-0.52***	-0.18***	-0.45***	-0.47***	-			

Table 5 (Continued)

Contem	3.59	0.92	-0.43 *	0.15 *	0.35 ***	0.16 *	-0.05	-0.17 **	-0.14 *	-0.20 ***	-0.16 **	0.40 ***	-		
Prep	2.65	0.85	0.04	-0.07	0.12 *	0.11	0.23 ***	0.16 **	0.08	0.17 **	0.21 ***	-0.13 *	0.34 ***	-	
Action	2.96	1.00	0.39 ***	-0.31 ***	0.00	0.12	0.41 ***	0.45 ***	0.21 ***	0.39 ***	0.35 ***	-0.58 ***	-0.13 *	0.29 ***	-
Maint	2.90	1.14	0.62 ***	-0.29 ***	-0.11	0.13 *	0.45 ***	0.58 ***	0.33 ***	0.52 ***	0.50 ***	-0.64 ***	-0.56 ***	0.10	0.51 ***

Note. EMS: Exercise Motivation Scale; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure). 7-Day Ex-Freq: Self-reported average weekly frequency of exercise in the past 3 months; Reg: Regulation; Introj: Introjected; Ident: Indentified; Integ: Integrated; IM: Intrinsic Motivation; Accom: Accomplish; Exp: Experience Sensations; Precont: Precontemplation; Contem: Contemplation; Prep: Preparation; Maint: Maintenance.
*$p < .05$ ** $p < .01$ *** $p < .001$

Table 6
Bivariate Correlations for Self-Reported Leisure Activity (DV – PAQ LSI*), Motivation Subscales (IV* - EMS*), and* Readiness for Change Subscales *(IV –* URICA-E2*)*

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
PAQ LSI	42.16	25.30	-												
EMS Amotiv	6.41	3.38	0.22***	-											
External Reg	12.53	4.26	-0.06	0.32***	-										
Introj Reg	14.19	4.00	-0.02	0.20***	0.64***	-									
Ident Reg	19.68	3.24	0.26***	-0.39***	0.05	0.30***	-								
Integ Reg	16.36	4.14	0.20***	-0.31***	0.05	0.40***	0.73***	-							
IMLearn	14.97	4.20	0.07	-0.12*	0.07	0.11	0.42***	0.51***	-						
IMAccom	17.35	3.83	0.22***	-0.33***	-0.04	0.22***	0.65***	0.75***	0.65***	-					
IMExp	17.65	3.80	0.20***	-0.35***	-0.08	0.14*	0.67***	0.67***	0.67***	0.81***	-				
URICA Precont	2.46	.86	-0.31***	0.56***	0.26***	-0.07	-0.47***	-0.52***	-0.18**	-0.46***	-0.47***	-			
Contem	3.60	.93	-0.15*	0.16*	0.35***	0.16**	-0.04	-0.16**	-0.14*	-0.20**	-0.16**	0.40***	-		

Table 6 (Continued)

Prep	2.67	.85	0.13 *	-0.06	0.11	0.11	0.24 ***	0.16 ***	0.08	0.17 **	0.19 **	-0.12 *	0.35 ***	-	
Action	2.97	1.00	0.31 ***	-0.31 ***	-0.01	0.11	0.39 ***	0.43 ***	0.19 **	0.39 ***	0.33 ***	-0.58 ***	-0.14 *	0.28 ***	-
Maint	2.89	1.13	0.38 ***	-0.29 ***	-0.12	0.12	0.43 ***	0.56 ***	0.31 ***	0.52 ***	0.48 ***	-0.64 ***	-0.56 ***	0.09	0.51 ***

Note. EMS: Exercise Motivation Scale; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure); PAQ LSI: Physical Activity Questionnaire Leisure Score Index; Reg: Regulation; Introj: Introjected; Ident: Indentified; Integ: Integrated; IM: Intrinsic Motivation; Accom: Accomplish; Exp: Experience Sensations; Precont: Precontemplation; Contem: Contemplation; Prep: Preparation; Maint: Maintenance.
*$p < .05$ ** $p < .01$ *** $p < .001$

Table 7
Bivariate Correlations for Self-Reported Global Physical Activity (DV – SBAS GAL*), Motivation Subscales (IV* - EMS*), and* Readiness for Change Subscales *(IV –* URICA-E2*)*

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
SBAS GAL	1.58	1.09	-												
EMS Amotiv	6.44	3.39	-0.34***	-											
External Reg	12.49	4.28	-0.17***	0.32***	-										
Introj Reg	14.18	3.99	0.02	0.20***	0.64***	-									
Ident Reg	19.65	3.25	0.46***	-0.40***	0.05	0.29***	-								
Integ Reg	16.35	4.12	0.46***	-0.32***	0.05	0.40***	0.73***	-							
IMLearn	14.97	4.18	0.24***	-0.12*	0.07	0.11	0.42***	0.51***	-						
IMAccom	17.34	3.82	0.42***	-0.34***	-0.05	0.22**	0.65***	0.75***	0.65***	-					
IMExp	17.63	3.79	0.45***	-0.36***	-0.08	0.14*	0.67***	0.67***	0.67***	0.81***	-				
URICA Precont	2.47	0.87	-0.56***	0.55***	0.25***	-0.08	-0.48***	-0.52***	-0.18***	-0.45***	-0.47***	-			

Table 7 (Continued)

Contem	3.60	0.92	-0.45***	0.16*	0.35***	0.16*	-0.04	-0.16**	-0.14*	-0.20***	-0.16**	0.40***	-		
Prep	2.66	0.86	0.09	-0.05	0.12*	0.12	0.23***	0.16**	0.07	0.16**	0.19**	-0.13*	0.35***	-	
Action	2.96	1.00	0.41***	-0.31***	-0.01	0.11	0.39***	0.43***	0.19**	0.38***	0.34***	-0.58***	-0.14*	0.29***	-
Maint	2.89	1.13	0.67***	-0.29***	-0.11	0.12	0.43***	0.56***	0.31***	0.51***	0.48***	-0.63***	-0.56***	0.09	0.51***

Note. EMS: Exercise Motivation Scale; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure); SBAS GAL: Stanford Brief Activity Survey Physical Activity Level; Reg: Regulation; Introj: Introjected; Ident: Indentified; Integ: Integrated; IM: Intrinsic Motivation; Accom: Accomplish; Exp: Experience Sensations; Precont: Precontemplation; Contem: Contemplation; Prep: Preparation; Maint: Maintenance.
*$p < .05$ ** $p < .01$ *** $p < .001$

Table 8

Multiple Linear Regression Model Summary on the Effect of Participant Motivation (EMS) and Readiness for Change (URICA-E2) on Self-Reported Indicators of Overall Physical Activity (DV – 7-day Ex-Freq, PAQ LSI, SBAS GAL)

Model	Measure	7-day Ex-Freq					
		R	R^2	*F*	df_1	df_2	*p*
1	EMS	.46	.214	5.82	8	171	.000***
2	URICA-E2	.66	.429	12.48	5	166	.000***
		PAQ LSI					
		R	R^2	*F*	df_1	df_2	*p*
1	EMS	.31	.10	2.36	8	173	.02*
2	URICA-E2	.45	.20	4.19	5	168	.001***
		SBAS GAL					
		R	R^2	*F*	df_1	df_2	*p*
1	EMS	.56	.31	9.96	8	175	.000***
2	URICA-E2	.73	.54	16.55	5	170	.000***

Note. EMS: Exercise Motivation Scale; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure); 7-Day Ex-Freq: Self-reported average weekly frequency of exercise in the past 3 months; PAQ LSI: Physical Activity Questionnaire Leisure Score Index; SBAS: Stanford Brief Activity Survey Physical Activity Level.

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 9

Multiple Linear Regression Analyses on the Effect of Participant Motivation (IV - EMS) and Readiness for Change (IV - URICA) on Self-Reported Weekly Exercise Frequency (DVs – 7-day Ex-Freq*)*

Model	Measure/Scales	7-day Ex-Freq				
		B	β	*t*	*p*	r_{part}
1	EMS					
	Amotivation	-.05	-.11	-1.37	.17	-.093
	External Regulation.	-.03	-.09	-.93	.35	-.063
	Introjected Regulation	-.02	-.05	-.48	.63	-.032
	Identified Regulation	-.03	-.06	-.51	.61	-.034
	Integrated Regulation	.12	.33	2.63	.01**	.178
	Intrinsic Motivation to Learn	-.01	-.03	-.26	.79	-.018
	Intrinsic Motivation to Accomplish	-.03	-.08	-.62	.54	-.042
	Intrinsic Motivation to Experience	.10	.24	1.83	.07	.124
2	URICA-E2					
	Precontemplation	-.18	-.10	-.98	.33	-.06
	Contemplation	-.22	-.13	-1.48	.14	-.09
	Preparation	-.01	-.01	-.074	.94	-.00
	Action	.14	.09	1.13	.26	.07
	Maintenance	.54	.39	3.86	.00***	.23

Note. EMS: Exercise Motivation Scale; URICA: University of Rhode Island Change Assessment – Exercise (Continuous Measure). 7-Day Ex-Freq: Self-reported average weekly frequency of exercise in the past 3 months.

*$p < .05$ ** $p < .01$ *** $p < .001$

Table 10

Multiple Linear Regression Analyses on the Effect of Participant Motivation (IV - EMS) and Readiness for Change (IV - URICA) on the Physical Activity Level Indices (DVs – PAQ LSI, SBAS GAL)

Model	*Measures*	PAQ LSI					SBAS GAL				
		B	β	*t*	*p*	r_{part}	*B*	β	*t*	*p*	r_{part}
1	EMS										
	Amotivation	-.76	-.10	-1.17	.25	-.08	-.026	-.08	-1.08	.28	-.07
	External Reg	.30	.05	.50	.62	.04	-.024	-.09	-1.07	.29	-.07
	Introjected Reg	-.72	-.11	-1.02	.31	-.07	-.023	-.08	-.86	.39	-.05
	Identified Reg	1.40	.18	1.53	.13	.11	.060	.18	1.74	.08	.11
	Integrated Reg	.19	.03	.24	.82	.02	.072	.27	2.37	.02*	.15
	IM to Learn	-.72	-.12	-1.12	.26	-.08	-.025	-.10	-1.06	.29	-.07
	IM to Accomplish	.93	.14	.97	.34	.07	-.003	-.01	-.085	.93	-.01
	IM to Experience	.08	.01	.09	.93	.01	.056	.20	1.59	.11	.10
2	URICA-E2										
	Precontemplation	-.53	-.02	-.15	.88	-.01	-.10	-.08	-.89	.37	-.05
	Contemplation	1.09	.04	.37	.71	.03	-.22	-.18	-2.29	.02*	-.12
	Preparation	1.07	.04	0.44	.66	.03	.062	.05	.78	.43	.04
	Action	2.63	.10	1.12	.27	.08	.031	.03	.41	.69	.02
	Maintenance	7.77	.35	2.97	.00**	.21	.39	.40	4.55	.000***	.24

Note. EMS: Exercise Motivation Scale; Reg: Regulation; IM: Intrinsic Motivation; URICA-E2: University of Rhode Island Change Assessment – Exercise (Continuous Measure).; PAQ LSI: Physical Activity Questionnaire Leisure Score Index (7-day); SBAS: Stanford Brief Activity Survey; SBAS GAL: SBAS Global Activity Level.

*$p < .05$ ** $p < .01$ *** $p < .001$

APPENDIX B: RESEARCH PARTICIPATION REQUEST

The following request will be sent via e-mail to all volunteering faculty and university administrators, who will forward it via their department listserv, distribute across their course roster, or post on the undergraduate research participation system:

ATTN: The following request comes from a doctoral student researcher from the University of Tennessee, Knoxville. Please consider participating in his study.

Dear Students,

My name is Jason Ruggieri, and I am a doctoral student in counseling psychology conducting my dissertation under the direction of Jacob Levy, PhD. I invite you to participate in a study approved by the Institutional Review Board at University of Tennessee, Knoxville. The study will be examining college students' motivation to exercise.

Participation is voluntary and you may withdraw from the study at any point in time. The survey will take approximately 15 minutes to complete, and it will provide information regarding exercise behaviors, motivation to exercise, and exercise identity among college students. To be eligible to participate, you must be a currently enrolled college student.

If you have questions or concerns about this research, please feel free to contact Jason Ruggieri at jruggier@vols.utk.edu.

To participate, please click on the link below:

https://www.surveymonkey.com/r/RuggieriExerciseMotivations

Regards,
Jason Ruggieri, M.S.
Department of Psychology
University of Tennessee, Knoxville
jruggier@vols.utk.edu

APPENDIX C: INFORMED CONSENT

College Students, Motivation, and Exercise Behaviors

INTRODUCTION

You are invited to participate in a research study. The purpose of this study is to examine exercise behavior in college students. We hope to garner insights pertaining to students' engagement in exercise behaviors, motivation to exercise, and their exercise identity. Please be aware that this study will have NO influence on your academic standing or evaluation, with the exception of University of Tennessee students participating through the SONA research system. At your instructor's discretion, you may earn credit toward your course grade. If you choose not to participate in this study and are a UTK student using the SONA, you may choose to earn course credit using the alternative research paper option. For all participants: You may discontinue your participation at any time (prior to final data analysis) without penalty.

INFORMATION ABOUT PARTICIPANTS' INVOLVEMENT IN THE STUDY

You will be asked to complete a basic demographic information and four surveys to gauge exercising experiences and your opinions about exercise. The inventories in the study will take approximately 15 minutes to complete. Your participation in this is on a voluntary basis, and you may refuse or discontinue participation at any without consequence.

Participating in this study poses minimal foreseeable risks or harm. Due to the evaluative nature of the measures, you may feel slight discomfort. Most research involves some risk to confidentiality and it is possible that someone could find out you were in this study or see your study information, but the investigators believe this risk is unlikely because of the procedures we will use to protect your information. You will be providing an electronic signature to consent to participation. This signature will be held separately from all other demographic information, to protect confidentiality. To minimize these risks, precautions have been taken to password protect and secure your data, limiting its access to only the primary investigator and faculty advisor. All survey measures used in this study have been examined for appropriate efficacy in collecting the information required by this research. All research investigators are trained in the distribution and interpretation of these instruments and in the appropriate storage and handling of raw data, including the securing of identifying information during data analysis.

If any questions or concerns arise during your participation in this study, ***please contact the primary investigator or faculty advisor***, listed below. Remember, you may discontinue your participation in this study at any time without penalty. No monetary compensation will be offered as a benefit for your participation in this study. You may indirectly benefit from this study as the results of this research may be used to provide feedback about enhancing health and well-being among college students. Your collective participation in this study, along with other participants, will be used to further the psychology of exercise knowledgebase.

CONFIDENTIALITY AND PARTICIPATION

All documents and information pertaining to your participation in this research study will be kept confidential, unless required by federal, state, or local laws and regulations to be disclosed. Records and data generated by the study will be entered into and stored on a secure database. No references will be made in oral or written reports that could identity you as a study participant or to your individual responses. Reported results will only indicate overall trends (aggregate data) for the uses in publications and professional presentations.

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the principal investigator, Jason Ruggieri at jruggier@vols.utk.edu or his faculty advisor: Jacob J. Levy, Ph.D. at 1404 Circle Dr., RM 410, Knoxville, TN 37996, by phone (865) 974-4866, or by email jlevy4@utk.edu. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-7697. You will be given a copy of this informed consent statement.

CONSENT

I am at least 18 years of age and have read and understand the above explanation of this research project being conducted by Jason Ruggieri under the direction of Dr. Jacob Levy. I voluntarily agree to participate in this study. My signature below and my answering of the survey items will act as my informed consent.

APPENDIX D: BASIC DEMOGRAPHICS QUESTIONNAIRE

Age: _____

Socio-Economic Status:
Working Class
Lower-Middle Class
Middle Class
Upper-Middle Class
Upper Class
Don't Know
NO ANSWER
Other (please specify)_____

Are you a Person of Color: Yes or No

Race/Ethnicity:
American Indian / Alaska Native
Asian / Asian American
Black / African American
Hispanic / Latino
Native Hawaiian / Other Pacific Islander
Biracial / Multiracial
White/Caucasian
No Answer
Other (please specify) _____

Please list your other racial/ethnic identities, if any:_____

Do you identify as Asexual? Yes or No

Please select your primary sexual orientation:
Lesbian
Gay
Bisexual
Pansexual
Queer
Fluid
Heterosexual
Other (please specify) _____

Please list your other sexual identities, if any:_____

Do you identify with the trans umbrella AND/OR have a transgender or transsexual history? Yes or No

Please select your primary gender identity:
Woman
Man
Gender Non-Conforming/Non Binary/Gender Queer Person
Other (please specify)_____

Please list your other gender identities, if any: _____

Please select your sex assigned at birth:
Female
Male

Do you identify as intersex? Yes or No

Weight: _____ lbs Height: _____ inches

Collegiate Year (circle one):

FRESHMAN SOPHOMORE JUNIOR SENIOR GRADUATE

Academic Major:_____
(if music performance major, please specify instrument and/or program)

What is the highest level of education you have received?
Some High School
High School Degree/GED
Some College
Associate's Degree
BA/BS/BFA or Equivalent
Some Graduate School
Master's Degree (MA, MFA, MSW, MBA, ect.)
Doctorate Degree or Equivalent (PhD, JD, MD, etc.)
No Answer
Other (please specify)_____

Do you currently participate in marching band or any other marching music activity (e.g., drum corps, winter guard, etc.)?
YES NO

If yes, what activity or activities?
_____
_____

Athletic Organization/Team Affiliation: _____
(if a student-athlete, specify sport/team and position/role)

In the past three months, how many times per week (on average) did you exercise for at least 30 minutes/day? _____

Is exercise a required component of your training? YES NO
If yes, what is the purpose of this requirement? _____
_____
_____

Other than any marching music or university athletic activities you may have noted above, please identify the types of exercise or physical activity you regularly do:
_____
_____
_____
_____
_____

APPENDIX E: GODIN LEISURE-TIME EXERCISE QUESTIONNAIRE

Godin Leisure-Time Exercise Questionnaire

1. During a typical **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

	Times Per Week
a) STRENUOUS EXERCISE (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
b) MODERATE EXERCISE (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
c) MILD EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

2. During a typical **7-Day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)?

OFTEN	SOMETIMES	NEVER/RARELY
1. ☐	2. ☐	3. ☐

APPENDIX F: STANFORD BRIEF ACTIVITY SURVEY

APPENDIX TABLE 1.

Stanford Brief Activity Survey of on-the-job activity

A. ☐	If you have no job or regular work, check box A and go on to Appendix table 2.
B. ☐	I spent most of the day sitting or standing. When I was at work, I did such things as writing, typing, talking on the telephone, assembling small parts, or operating a machine that takes very little exertion or strength. If I drove a car or truck while at work, I did not lift or carry anything for more that a few minutes each day.
C. ☐	I spent most of the day walking or using my hands and arms in work that required moderate exertion. When I was at work, I did such things as delivering mail, patrolling on guard duty, doing mechanical work on automobiles or other large machines, house painting, or operating a machine that requires some moderate-activity work of me. If I drove a truck or lift, my job required me to lift and carry things frequently.
D. ☐	I spent most of the day lifting or carrying heavy objects or moving most of my body in some other way. When I was at work, I did such things as stacking cargo or inventory, handling parts or materials, or doing work like that of a carpenter who builds structures or a gardener who does most of the work without machines.
E. ☐	I spent most of the day doing hard physical labor. When I was at work, I did such things as digging or chopping with heavy tools or carrying heavy loads (bricks, for example) to the place where they were to be used. If I drove a truck or operated equipment, my job also required me to do hard physical work most of the day with only short breaks.

APPENDIX TABLE 2.

Stanford Brief Activity Survey of leisure-time activity

F. ☐	Most of my leisure time was spent without very much physical activity. I mostly did things like watching television, reading, or playing cards. If I did anything else, it was likely to be light chores around the house or yard or some easy-going game like bowling or catch. Only occasionally, no more than once or twice a month, did I do anything more vigorous, like jogging, playing tennis, or active gardening.
G. ☐	Weekdays, when I got home from work, I did few active things, but most weekends I was able to get outdoors for some light exercise—going for walks, playing a round of golf (without motorized carts), or doing some active chores around the house.
H. ☐	Three times per week, on average, I engaged in some moderate activity, such as brisk walking or slow jogging, swimming, or riding a bike for 15–20 minutes or more, or I spent 45 minutes to an hour or more doing moderately difficult chores, such as raking or washing windows, mowing the lawn or vacuuming, or playing games such a doubles tennis or basketball.
I. ☐	During my leisure time over the past year, I engaged in a regular program of physical fitness involving some kind of heavy physical activity at least three times per week. Examples of heavy physical activity are jogging, running, or riding fast on a bicycle for 30 minutes or more; heavy gardening or other chores for an hour or more; active games or sports such as handball or tennis for an hour or more; or a regular program involving calisthenics and jogging or the equivalent for 30 minute or more.
J. ☐	Over the past year, I engaged in a regular program of physical fitness along the lines described in the last paragraph (I), but I did it almost *daily*—five or more times per week.

APPENDIX G: EXERCISE MOTIVATION SCALE

Exercise Motivation Scale

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

Direction: Please read each of the statements listed below and indicate how strongly you agree or disagree with each statement by circling the appropriate response to the right of the statement. Use the following response categories:

Strongly disagree (SD) 1	Disagree (D) 2	Moderately disagree (MD) 3	Moderately agree (MA) 4	Agree (A) 5	Strongly agree (SA) 6

	SD	D	MD	MA	A	SA
1. For the pleasure it gives me to experience positive sensations from the activity.	1	2	3	4	5	6
2. For the satisfaction it gives me to increase my knowledge about this activity.	1	2	3	4	5	6
3. Because other people believe that it's a good idea for me to exercise.	1	2	3	4	5	6
4. Because I must exercise to feel good about myself.	1	2	3	4	5	6
5. Because I believe that regular exercise is a good way to enhance my overall development.	1	2	3	4	5	6
6. Because it is consistent with what I value.	1	2	3	4	5	6
7. I can't understand why I am doing this.	1	2	3	4	5	6
8. Because I feel pressure from others to participate.	1	2	3	4	5	6
9. Because I think that exercise allows me to feel better about myself.	1	2	3	4	5	6
10. For the pleasure I experience while learning about this activity.	1	2	3	4	5	6
11. For the satisfaction I feel when I get into the flow of this activity.	1	2	3	4	5	6
12. Because I feel I have to do it.	1	2	3	4	5	6

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

	SD	D	MD	MA	A	SA
13. To satisfy people who want me to exercise.	1	2	3	4	5	6
14. Because exercising is an important aspect of how I perceive myself.	1	2	3	4	5	6
15. For the pleasure of understanding this activity.	1	2	3	4	5	6
16. I have no idea.	1	2	3	4	5	6
17. For the pleasure of mastering this activity.	1	2	3	4	5	6
18. Because I think it is a good thing for my personal growth.	1	2	3	4	5	6
19. For the pleasure I experience when I feel completely absorbed in the activity.	1	2	3	4	5	6
20. For the satisfaction I feel while I try to achieve my personal goals during the course of this activity.	1	2	3	4	5	6
21. Because I would feel guilty if I did not take the time to do it.	1	2	3	4	5	6
22. Because I value the way exercise allows me to make changes in my life.	1	2	3	4	5	6
23. It is not clear to me anymore.	1	2	3	4	5	6
24. Because I think exercise contributes to my health.	1	2	3	4	5	6
25. To comply with expectations of others (e.g., friends).	1	2	3	4	5	6
26. For the enjoyment that comes from how good it feels to do the activity.	1	2	3	4	5	6
27. Because I enjoy the feelings of discovering more about this activity.	1	2	3	4	5	6
28. Because I enjoy the feelings of improving through participating in this activity.	1	2	3	4	5	6

WHY ARE YOU CURRENTLY PARTICIPATING IN THIS ACTIVITY?

	SD	D	MD	MA	A	SA
29. Because I feel that changes that are taking place through exercise are becoming part of me.	1	2	3	4	5	6
30. For the pleasure I experience while trying to become the person I want to be.	1	2	3	4	5	6
31. Because I would feel ashamed if I was not doing anything to improve my current situation.	1	2	3	4	5	6

APPENDIX H: URICA-E2

Exercise Stage of Change Questionnaire

Please use the following definition of exercise when answering these questions:

Regular Exercise is any planned physical activity (e.g., brisk walking, aerobics, jogging, bicycling, swimming, rowing, etc.) performed to increase physical fitness. Such activity should be performed 3 to 5 times per week for 20-60 minutes per session. Exercise does not have to be painful to be effective but should be done at a level that increases your breathing rate and causes you to break a sweat.
Please enter the number in the right-hand column that indicates how strongly you agree or disagree with the following statements.

1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly Agree

1.	As far as I'm concerned, I don't need to exercise regularly.
2.	I have been exercising regularly for a long time and I plan to continue.
3.	I don't exercise and right now I don't care.
4.	I am finally exercising regularly.
5.	I have been successful at exercising regularly and I plan to continue.
6.	I am satisfied with being a sedentary person.
7.	I have been thinking that I might want to start exercising regularly.
8.	I have started exercising regularly within the last 6 months.
9.	I could exercise regularly, but I don't plan to.
10.	Recently, I have started to exercise regularly.
11.	I don't have the time or energy to exercise regularly right now.
12.	I have started to exercise regularly, and I plan to continue.
13.	I have been thinking about whether I will be able to exercise regularly.

14.	I have set up a day and a time to start exercising regularly within the next few weeks.
15.	I have managed to keep exercising regularly through the last 6 months.
16.	I have been thinking that I may want to begin exercising regularly.
17.	I have lined up with a friend to start exercising regularly within the next few weeks.
18.	I have completed 6 months of regular exercise.
19.	I know that regular exercise is worthwhile, but I don't have time for it in the near future.
20.	I have been calling friends to find someone to start exercising with in the next few weeks.
21.	I think regular exercise is good, but I can't figure it into my schedule right now.
22.	I really think I should work on getting started with a regular exercise program in the next 6 months.
23.	I am preparing to start a regular exercise group in the next few weeks.
24.	I am aware of the importance of regular exercise but I can't do it right now.

APPENDIX I

Thank You for Participation

* The following document will be uploaded as the final page of the Survey Monkey online survey protocol. *

Thank you for participating in this study of college students' exercise behaviors, motivations, and readiness for change.

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the principal investigator, Jason Ruggieri at jruggier@vols.utk.edu or his faculty advisor: Jacob J. Levy, Ph.D. at 1404 Circle Dr., RM 410, Knoxville, TN 37996, by phone (865) 974-4866, or by email jlevy4@utk.edu. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at (865) 974-7697. You will be given a copy of this informed consent statement.

VITA

Jason Ruggieri was born on April 5, 1985 in Somerville, NJ. He graduated from Middlesex High School in Middlesex, NJ in 2003. In 2007, Jason earned a B.A. in Psychology from The College of New Jersey. During his time at TCNJ, he was captain and stroke (lead) seat of their intercollegiate rowing team. Following two years working full-time as a special education vocational coordinator and job coach, Jason graduated in 2011 with a Psychology of Human Movement M.S. degree from Temple University. He completed a master's thesis entitled, *Rowers' Perceptions of Exercise Adherence and Rowing Culture: a Mixed-Methods Investigation*. Jason spent the following year as a personal fitness trainer in Verona, NJ, prior to enrolling in Indiana University, Bloomington's M.S. Counseling and Counselor Education degree program. Immediately upon completion of the M.S degree at IU Bloomington in 2014, Jason began his doctoral studies in the Counseling Psychology Program at the University of Tennessee, Knoxville. He plans to graduate in August 2020 with a Ph.D. in Counseling Psychology upon completion of his APA pre-doctoral internship with the United States Air Force at Lackland Air Force Base in San Antonio, TX. Following graduation and passing his licensing boards, Jason will continue to serve as an active duty licensed clinical psychologist for the U.S. Air Force.