TOO MUCH EXERCISE: NEGATIVE CORRELATES OF EXERCISE AMONG COLLEGE STUDENTS

by

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ABSTRACT

The following project sought to find negative correlates of exercise, such as exercise dependence or exercise addiction, and to determine how they relate to well-being and eating behaviors. The study also asked questions about things that could aid in the prediction of who may become dependent on or addicted to exercise by asking for a person's perceived happiness, frequency of exercise, reasons for exercising, and eating behavior. Participants were volunteer college students. Results of the study concluded that there is a negative relationship between eating disorders and well-being, and that individuals exhibiting an eating disorder are more inclined to be addicted to or dependent on exercise. Limitations and suggestions for future studies are included.

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CHAPTER I

Introduction

Exercise is best known for its positive mental and physical health benefits (e.g., Catellier & Yang, 2013; Haskell et al., 2007). Although rare, exercising without limits and to damaging degrees can have detrimental physical and mental health effects, including physical injuries (e.g., Fredericson & Misra, 2007. Mental health effects from exercising too much include exercise addiction or exercise dependence (e.g., Hausenblas & Downs, 2002; Terry, Szabo, & Griffiths, 2004). Furthermore, excessive exercise can exist in combination with an eating disorder, which may negatively affect a person's well-being (Thome & Espelage, 2004). It is a commonality that people often exercise to increase positive affect, but people suffering from exercise dependence, an eating disorder, or both may not receive the positive effects from exercising (Hausenblas & Downs, 2002; Terry et al., 2004; Thome & Espelage, 2004).

Theoretical Focus of Study

Cognitive-behavioral theories of personality development (e.g., Dobson, 2010) have confirmed an association between personality variables (e.g., well-being), gender-linked maladaptive behavioral traits (e.g., eating disorders), and habits of daily living (e.g., exercise routines). This type of theory documents that human behavior is largely determined by how people interpret their world (Dobson, 2010). The current study investigates variables that relate positively as well as negatively to exercising, such as well-being, frequency of exercising, and disordered eating or dieting behavior. In the present study, characteristics from those who receive positive mental health benefits from exercise will be distinguished from characteristics of those whose exercise routines

negatively affect their mental health. Exercise can negatively affect a person's mental health when it takes precedence in life and dominates his or her thinking (Griffiths, 1997), possibly in the form of exercise addiction (Terry et al., 2004) or dependence (Hausenblas & Downs, 2002).

Physical Activity

The U.S. Department of Health and Human Services (1996) conceptualizes physical activity as physical movement of the body due to the contracting of muscles that causes a significant amount of energy to be expended. Furthermore, Miles (2007) found the definitional range of physical activity to encompass exercise and competitive sports to hobbies or everyday activities requiring movement. It is no secret that physical activity is beneficial to one's physical health.

According to Haskell et al. (2007), an appropriate amount of exercise for healthy adults ages 18-65 is exercising at moderate intensity for 30 min 5 days a week, or exercising with vigorous intensity for a minimum of 20 min 3 days a week. Furthermore, in 2008, the U.S. Department of Health suggested that in order for an individual to promote and maintain a healthy lifestyle, it is recommended the individual participate in a minimum of 150 min of moderately intense exercise, 75 min of vigorous exercise each week, or a combination of the two (U.S. Department of Health, 2008). If an individual is seeking to lose weight, it is recommended from both the American Heart Association and the U.S. Department of Health that the individual exceed the minimum recommended amount of exercise, but not exceeding 300 min of moderately intense exercise or 150 min of vigorously intense exercise per week (Haskell et al., 2007; U.S. Department of Health, 2008).

Moderately intense physical activity is characterized by walking briskly with a noticeable fluctuation in heart rate; jogging or any activity that produces rapid breathing and a considerably accelerated heart rate characterizes *vigorously intense* physical activity. Moderate or vigorous physical activity is separate from everyday activities, such as doing chores or casually walking, which are considered to be of light intensity. However, moderate and vigorous physical activity can be done in combination, and should be intertwined with muscle strengthening activities 2 days a week (Haskell et al., 2007).

Exercise can be beneficial to other aspects of a person's life, not just mental and physical health. When exercising with another person or in a group, social interactions and bonding may be strengthened. Exercising with a significant other could be beneficial for the relationship because it is a shared interest that results in positive, constructive time spent together. Furthermore, making time for exercise may require time management skills which could in turn positively affect academics or work (Kulas, 2013).

In sum, it is recommended that a person participate in a minimum of 150 min per week of moderately intense exercise or 75 min of vigorous exercise per week to maintain a healthy lifestyle (U.S. Department of Health, 2008). Exercise should not exceed 300 min of moderately intense exercise or 150 min of vigorous exercise per week (Haskell et al., 2007: U.S. Department of Health, 2008). Moderately and vigorously intense exercise can be done in combination, and strength conditioning exercises should be combined as well (U.S. Department of Health, 2008).

Positive Effects of Exercise

For regularly physically active individuals, the risk for certain diseases is typically less than for sedentary individuals. Those who are physically active are less at risk for diseases such as cardiovascular disease, stroke, hypertension, type II diabetes, osteoporosis, obesity, colon cancer, breast cancer, anxiety, and depression (Haskell et al., 2007). Furthermore, Haskell et al. (2007) noted that if people engage in the minimum recommendation of physical activity, not only will they maintain their health and reduce the risk of acquiring a chronic disease, they also tend to live longer.

In addition to physical activity being associated with physical health, research has shown that exercise can contribute to positive mental health outcomes. Several research studies have shown that regular physical activity can help alleviate stress from one's life and contribute to a person's overall well-being (Thome & Espelage, 2004). Kim et al. (2012) recently suggested that regular physical activity was an effective preventative strategy in coping with mental health problems, such as anxiety disorders. In another study, Colcombe et al. (2006) found that as little as three hours per week of aerobic exercise can increase brain efficiency. Overall, the general consensus is that physical activity does more good than harm for a person's physical and mental health (Colcombe et al., 2006; Kim et al., 2012; Thome & Espelage, 2004).

In sum, physically active individuals are less at risk for certain diseases such as cardiovascular disease than sedentary individuals. Physical activity can positively contribute to a person's well-being by alleviating stress and by providing an effective coping strategy. And, the general consensus among researchers is that exercise has a positive impact.

Negative Effects of Exercise

Evidence also exists that exercise can be detrimental to physical health. Some negative consequences associated with physical health could come from exercising to damaging degrees and without limits. Examples of exercising to damaging degrees refers to physical injuries to one's body, such as broken bones or sprained body parts, due to too much exertion on the body. Exercising without limits can cause fatigue or exhaustion and in extreme cases, even hospitalization. Exercising without limits and to damaging degrees can cause strain on the body, which can negatively impact a person's physical health (Terry et al., 2004).

Consider marathon runners, for instance. According to Fredericson and Misra (2007), there is clearly an elevated risk of injury for distance runners, particularly those who run more than 40 miles per week. This study found that the most common injuries acquired by runners pertained to the knee. Krabak, Waite, and Schiff (2011) studied injury rates in multiday ultramarathon runners and found that as many as 95% of runners experience some type of injury. Although most of the injuries were minor in nature, 85% required medical treatment. In a similar study, Ristolainen, Heinonen, Waller, Kujala, and Kettunen (2009) studied injury risk and types of injuries received by cross country skiers, swimmers, soccer players, and long-distance runners. The results of the study concluded that men obtained overuse injuries mostly occurring in the thigh region whereas womens' overuse injuries were more likely in their ankles. Thus, exercising too often can cause detrimental physical injuries to the body.

One might ask, what keeps these competitors going despite the high rate of injuries? Stephan, Deroche, Brewer, Caudroit, and Le Scanff (2009) studied competitive

runners and their perceived susceptibility of obtaining an injury. The results indicated that how much people believe it is possible for them to obtain an injury due to excessive running depends on previously acquired injuries, neuroticism, and obsessive passion. In other words, it is possible that exercising could become an obsession, and one has to feed that obsession with exercise causing exercise addiction or dependence.

Not only can exercise negatively affect physical health, but exercising without limits and to damaging degrees can negatively impact a person's mental health. Some negative mental health side effects from exercise include exercise dependence or exercise addiction (Hausenblas & Downs, 2002; Terry et al., 2004). Exercise addiction or dependence may be detrimental to a person's mental health because exercise becomes something that individuals have to do, in turn causing stress when exercise is not obtainable due to time constraints or limited resources. This has a reverse effect on the alleviation of stress because exercise becomes a compulsive behavior.

For instance, Thome and Espelage (2004) hypothesized that exercise was used as a coping strategy for people with anorexia nervosa and bulimia nervosa. The researchers had 235 female and 86 male college students fill out questionnaires assessing exercise behavior, coping strategies, eating attitudes, self-esteem, life satisfaction, affect, depression, and anxiety. The authors concluded that men reaped positive psychological health benefits from exercise whereas positive outcomes from exercise only occurred in women in the absence of an eating disorder. This study is especially useful to the current study because in addition to finding gender differences, it suggests that assessing well-being in general and eating disorders in particular may aid in the prediction of how

people use exercise for their psychological health. Also, Thome and Espelage's sample was similar to that of the current study.

People will exercise for a variety of reasons. For instance, Silberstein, Striegel-Moore, Timko, and Rodin (1988) conceptualized that people exercise to control their weight, and to improve fitness, health, muscle tone, physical attractiveness, mood, and feelings of joy. People who exercise for different reasons may have different types of rewards and costs. In their study, Silberstein et al. (1988) found that women reported exercising for weight control more than men, which in turn can be associated with anorexia nervosa or bulimia nervosa. Furthermore, if an individual exercises for mood control, it could lead to the individual being dependent on exercise to control mood. For instance, if a person whose mood is dependent on exercise had to stop exercising, he or she could experience negative emotions.

In sum, exercise can have detrimental effects on a person's physical health, such as physical injuries, when it is done to the extremes. Physical activity can also have detrimental effects on a person's mental health, possibly in the form of exercise addiction or dependence. Furthermore, eating disorders can affect whether or not an individual receives mental health benefits from exercising.

Exercise Dependence and Addiction

One of the first steps in assessing exercise dependence or addiction is to define what does and does not constitute these conditions. In actuality, the occurrence of true exercise addiction is quite rare (de Coverley Veale, 1987). For instance, in a study using the Exercise Addiction Inventory, Terry et al. (2004) found that only 3% of the sample studied was labeled as "at risk" for exercise addiction.

In light of Griffiths' (1997) descriptions, the following are six components of exercise addiction. Exercise becomes an addiction when it becomes the most important thing in a person's life and dominates his or her thinking, feelings, or behaviors. People addicted to exercise experience some kind of mood modification, such as a high, and develop a tolerance for exercise and need more of it to experience the same feeling. People addicted to exercise experience withdrawal symptons, such as moodiness, when physical activity stops. Exercise addicts also experience conflicts with those around them, difficulties with activites such as a job or social life, and conflicts with themselves in regards to their exercise activities. Finally, an exercise addict is more likely than a non exercise addict to experience relapse in which extreme behaviors of exercise are restored after many years of normality.

Exercise addiction is often confused with a strong commitment to exercise. According to Terry et al. (2004), people with a strong commitment to exercise will engage in physical activity for extrinsic rewards, will view exercise as important, but not the most important thing in their lives, and most likely will not suffer withdrawal effects when exercise ceases or declines. On the other hand, people who are addicted to exercise will exercise for intrinsic rewards, view exercise as the most important part of their life, and experience withdrawal effects when exercise ceases or declines. Therefore, the definition of exercise addiction used for the purposes of this study will be, "exercising without limits and to damaging degrees" (Yates, 1991).

According to Hausenblas and Downs (2002), exercise dependence is a "condition in which moderate to vigorous physical activity becomes a compulsive behavior" (p. 387). Furthermore, Lejoyeux, Avril, Richoux, Embouazza, and Nivoli (2008)

characterized exercise dependence as “an inadequate pattern of exercise leading to clinically significant consequences” (p. 353). Exercise dependence is measured in terms of exercise level (e.g., frequency, duration, and intensity), signs or symptoms of withdrawal and tolerance, and exercising interfering with other obligations, such as work, academics, or social life (Hausenblas & Downs, 2002). Others have defined exercise dependence not only in terms of signs and symptoms, but by the amount the exerciser compromises his or her wellbeing and the degree to which the signs and symptoms are unwanted (Allegre, Souville, Therme, & Griffiths, 2006). Therefore, exercise dependence can be conceptualized as an interaction of cognitive, behavioral, and physiological symptoms (American Psychiatric Association, 1994). Exercise dependence differs from a strong commitment to exercise in that a person who is strongly committed to exercise will not allow exercise to become a compulsion, will not experience involuntary symptoms of withdrawal or tolerance, and will not let exercise interfere with other obligations.

In planning to assess for exercise addiction or exercise dependence, factors that are associated with these tendencies, such as well-being, must be taken into consideration. A couple of things that could aid in this prediction are an individual’s overall well-being and whether or not there is a presence of disordered eating. The purpose of testing for disordered eating and a person’s overall well-being is that people with lower scores on a well-being measure and people whose scores indicate the presence of an eating disorder will tend to have negative affect or neuroticism, and thus will be less likely to use physical activity in a positive way (Thome & Espelage, 2004).

In the DSM-IV, “excessive exercise” is characterized as an inappropriate compensatory behavior to people with bulimia nervosa (American Psychiatric Assosciation, 1994) and anorexia nervosa (Walsh, 2011). Exercise addiction is known to encompass excessive exercise. Exercise is deemed excessive when it, “significantly interferes with important activities, occurs at inappropriate times or inappropriate settings, or continues despite injury or other medical complications”(American Psychiatric Assocation, 1994, p. 546). Furthermore, Adkins and Keel (2005) found that there was both a quantitative and qualitative aspect of excessive exercise. The quantitative aspect refers to the frequency and duration of exercise. However, the quantitative aspect of exercise addiction is hard to define because there is not a clearly defined cutoff amount that constitutes excessive exercise. On the other hand, the qualitative aspect of excessive exercise categorizes exercise as a compulsive behavior that is likely to affect those with disordered eating. Rather than an enjoyable, voluntary behavior, exercise becomes an obsession, or an out of control drive to exercise.

Adkins and Keel (2005) measured both the quantitative and qualitative dimensions of exercise addiction by surveying 265 university students using the Drive for Thinness, Bulimia, and Body Dissatisfaction subscales from the Eating Disorder Inventory (EDI), the Reasons for Exercise Inventory (REI), and the Obligatory Exercise Questionnare (OEQ). Information about the frequency and duration of exercise was gathered as well. The researchers concluded that the compulsive quality of exercise is more characteristic of eating disorders than the quantity of exercise.

In sum, exercise addiction is rare, but its effects can be detrimental. Exercise dependence is represented by a need to exercise in order to function. In either addiction

or dependence, exercise becomes a compusive behavior, an individual experiences tolerance and withdrawal symptoms, and exercise interferes with other activities, such as school or work. Exercise addiction or dependence is often confused with a strong commitment to exercise. However, a person with a strong commitment to exercise will be less likely to view exercise as the most important thing in his or her life, to exercise because of a compulsion, to let exercise interfere with other obligations, and to experience withdrawal or tolerance symptoms.

Eating Disorders

It is important to measure the presence of eating disorders in the current study because eating disorders are common on college campuses, especially among the female population, and have been related to compulsive exercising (Berg, Frazier, & Sherr, 2009; Bratland-Sanda et al., 2010; Eisenberg, Nicklett, Roeder, & Kirz, 2011; Thome & Espelage, 2004). For instance, Bratland-Sanda et al. (2010) conducted an exploratory study with inpatient eating disorder patients looking at physical activity and exercise dependence. The authors found that a reduction in eating disorder symptoms was correlated with a reduction in exercise dependence. Additionally, exercise is generally associated with positive mental health benefits, but only in the absence of an eating disorder (Thome & Espelage, 2004). Bratland-Sanda et al. (2010) also found a reduction in the need to exercise for negative affect regulation amongst eating disorder patients who excessively exercise.

Clinical eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorder are characterized as a disturbance in eating behaviors. Walsh (2011) conceptualizes anorexia nervosa as, “a relentless pursuit of thinness through dieting and

exercise associated with intense fear of gaining weight or becoming fat despite the achievement of significantly low body weight" (p. 527). Furthermore, Walsh characterizes bulimia nervosa as binge eating episodes followed by inappropriately disposing of food from the body, typically from self-induced vomiting or excessive exercise. People with bulimia nervosa are typically of average weight. Bulimic behaviors occur at least twice a week for 3 months. Lastly, Walsh characterizes binge eating disorder as binge eating episodes without disposing the food intake. Unlike people with anorexia nervosa and bulimia nervosa, people with binge eating disorder are typically overweight and do not exercise to excess as a means to control their weight.

Unhealthy dieting may also relate to a person's sense of well being. Although the consequences of dieting are not as severe as those of clinical eating disorders, the impact can be much broader because unhealthy dieting is so common. Grigg, Bowman, and Redman (1996) identified extreme weight control practices as the use of "fasting, vomiting, diet pills, laxatives, cigarettes, and diruretics" as a means to control weight (p. 748).

The presence of an eating disorder has been found to occur in anywhere from 8% to 17% of the collegiate population (Eisenberg et al., 2011). The American College Health Association's National College Health Assessment (ACHA-NCHA, 2008) found that 3% of women and 0.4% of men reported having anorexia, 2% of women and 0.2% of men reported being bulimic, and 4% of women and 1% of men reported vomiting or taking laxatives as a means to lose weight. Clearly, women are more affected by eating disorders than men. The absence or presence of an eating disorder relates to the current

study because Berg et al. (2009) found that one of the most common correlates of anorexia nervosa and bulimia nervosa was excessive exercise.

Furthermore, a study conducted by Eisenberg et al. (2011) using college undergraduate students found that the presence of an eating disorder was commonly associated with depression and anxiety, which in turn negatively affects a person's well-being. Eisenberg et al. (2011) sampled 5,021 college students who answered online surveys pertaining to the presence of eating disorders and things that would aid in the prediction of having an eating disorder, such as health behaviors and mental health. Eating disorders were more commonly found among women in all races. The gender difference was particularly evident for whites, non-Hispanics, and Asian Americans as opposed to African Americans. The researchers found that the presence of an eating disorder was associated with depression, anxiety, suicidal thoughts, and self-injurious behavior. Furthermore, because of the secretive nature of eating disorders, the majority of the participants with the presence of an eating disorder did not seek help, which could become detrimental if an eating disorder worsens (Eisbenberg et al., 2011; Thomas & Espelage, 2004).

In sum, eating disorders are relatively common amongst collegiate females. Clinical eating disorders, such as anorexia nervosa and bulimia nervosa, have been linked with excessive exercise. Furthermore, eating disorders are comorbid with depression and anxiety, which in turn negatively affect a person's well-being.

Definitions of and Factors Associated with Well-being

Because well-being is known to be related to the presence of an eating disorder, it is an important aspect to measure in the current study. Well-being is difficult to define

because different cultures conceptualize it in different ways. However, well-being is linked with life satisfaction, happiness, and quality of life. What is agreed upon with regard to a universal definition of well-being is that good physical health and good mental health are necessary components of well-being (Anderson, Jane-Llopis, & Cooper, 2011).

Well-being is known to relate to virtually every aspect of a person's life, including how a person feels psychologically, socially, and physically (Moore, Bates, Brierley-Bowers, Taaffe, & Clymer, 2012). Also, several things are known to relate to a person's well-being. For instance, well-being relates to satisfaction with life, emotional stability, and the frequency with which one experiences positive and negative moods (Diener, Diener, & Diener, 2009). Well-being has both an objective and a subjective nature. Many objective factors, such as education level and socioeconomic status, relate to a person's well-being. Ultimately how a person perceives the objective factors, or quality of life, is what contributes the most to an individual's well-being, thus making up the subjective component of well-being (Diener et al., 2009; Moore et al., 2012). Evidence for well-being based on subjectivity can be shown by the fact that some people are unhappy despite wealth and many friends, whereas some can be happy in the face of obstacles in life, such as chronic poverty or the loss of a loved one. Happiness and subjective well-being are interchangeable terms (Seligman, 2011).

Several studies have shown that affect influences a person's decision to behave in certain ways or to engage in certain activities (Bohner, Crow, Erb, & Schwarz, 1992). Specifically, research exists examining how affect plays a role in a person's decision to exercise. The aforementioned aspects of well-being discuss general trait-like aspects of

well-being. In regards to exercise, well-being is more situation- and time-specific. For instance, people may use exercise for mood regulatory purposes and manage their moods through exercise choices. Furthermore, individuals may exercise as a coping strategy for stress, which in turn can affect well-being (Thome & Espelage, 2004).

Catellier and Yang (2013) hypothesized that when people are in a good mood and feeling happy, they are more likely to exercise compared to people with negative affect who may be discouraged from exercising. Furthermore, they hypothesized that one's affect determines a person's reasons for exercising, such as positive affect leading to predictable running which in turn leads to measures of increased happiness. Catellier and Yang also hypothesized that those with positive affect believe they will receive positive benefits from exercise, whereas those with negative affect see the risks of injury as greater than the rewards and thus are reluctant to exercise. To reach these conclusions the authors collected data from a sample of 153 college students. The participants were randomly assigned to one of three experimental conditions: positive affect, negative affect, and neutral. The participants then watched a video clip of either *America's Funniest Home Videos, Marley & Me,* or *Inside the Mind of Google,* respectively. After the video clip, the participants completed a survey asking how they felt about exercise. Using this experimental design, the authors concluded that positive affect made people more inclined to exercise, whereas negative affect had the opposite effect.

Although well-being is hard to define, researchers have agreed that good physical and mental health are necessary components of well-being (Anderson et al., 2011). Furthermore, exercise can be linked to well-being. For instance, affect can play a role in a person's decision to exercise (e.g., Catellier & Yang, 2013) and exercise can be used as a

coping strategy, especially amongst those with the presence of an eating disorder (Thome & Espelage, 2004). Exercise as it relates to well-being appears to be more situation- and time-specific (e.g., exercising for mood regulation) as opposed to the general trait-like aspects of well-being (e.g., positive or negative well-being).

Statement of the Problem and Hypotheses

Most previous research has focused on the positive effects of exercise for one's physical and mental health. For instance, those who exercise a minimum of 30 min five days a week reduce the risk for obesity, coronary heart disease, type II diabetes, osteoporosis, and certain cancers (Hallal, Victoria, Azevedo, & Wells, 2006) as well as stroke and hypertension (Haskell et al., 2007). Haskell et al. (2007) also found that regular physical activity can reduce anxiety and depressive symptoms in individuals. Catellier and Yang (2013) suggested that regular physical activity can help alleviate stress and can be used as a coping mechanism. Although the overall consensus of exercise is that it is beneficial, there are studies that suggest some negative effects of exercise. For instance, although exercise addiction or exercise dependence are rare phenomena, their effects can be detrimental for the individuals involved.

Limited research exists predicting who will receive positive mental health benefits from physical activity compared to those whose mental health will suffer as a result of exercise (Thome & Espelage, 2004). The purpose of the current study is to investigate variables that relate positively as well as negatively to exercising. In general, the current study will assess well-being, frequency of exercising, and disordered eating. The present study is primarily interested in distinguishing the characteristics of participants who reap

mental health benefits from exercise from the characteristics of those who suffer as a result of it.

Previous research has studied the use of exercise as a coping strategy, as well as how the frequency of exercise relates to a person's well-being and whether the individual studied had the presence of an eating disorder (Thome & Espelage, 2004). The previously mentioned study failed to recognize how well-being can affect a person's decision to exercise, such as a person dependent on exercise exercising for mood regulation. The previous study also failed to study what aids in the prediction of who will receive psychological benefits from exercise and whose affect and physical health may suffer as a result of too much exercise The current study examines the relationship between a person's well-being, the frequency and intensity with which one exercises, and the presence of an eating disorder and how they may correlate with negative effects of exercise, such as exercise dependence or addiction. This study is different from existing research in that the previous studies failed to examine all of the aforementioned variables in congruence, making the current study a comprehensive examination.

The following hypotheses are based on the theoretical perspective provided by cognitive behaviorism and the research literature reviewed previously.

1. The first hypothesis is that the measures of well-being, frequency of exercise, and presence of disordered eating or disordered dieting behavior, will be correlated. I expect a significant positive correlation between disordered eating and frequency of exercise. I expect frequency of exercise and exercise addiction or dependence to be positively correlated. I also expect a significant negative correlation between

well-being and disordered eating. The various facets of this hypothesis are consistent with the results of Thome and Espelage (2004).

2. The second hypothesis is that the three measures (well-being, frequency of exercise, and presence of disordered eating or dieting behavior) will differ by gender. In particular, I predict that women will report the presence of an eating disorder or dieting behavior more than men and that those women who do report disordered eating will also report lower well-being scores and higher frequencies of exercise than men. This hypothesis is consistent with the results of Thome and Espelage (2004).
3. The third hypothesis only deals with participants who do not report current dieting or the presence of an eating disorder. Those participants will be divided by their exercise frequency and by their gender. Thus, the independent variables are gender and frequency of exercise, and the dependent variable is well-being. I predict that among this non-disordered eating sub-sample, men will have higher well-being scores and higher frequencies of exercise than women. This prediction is consistent with the results of Catellier and Yang (2013).
4. The fourth hypothesis is that women and men will report different reasons for exercising. I expect women will report a greater tendency to exercise for weight control than men and men will report a greater tendency to exercise for mood regulation than women. I expect no other significant differences between men and women regarding other reasons for exercising. Those predictions are consistent with the results of Silberstein et al. (1988).

5. The fifth hypothesis is that individuals with an eating disorder will report lower well-being scores than individuals without an eating disorder. This hypothesis is consistent with the results from Eisenberg et al. (2011) and Walsh (2011).
6. The sixth hypothesis is that participants with symptoms of anorexia nervosa (AN), bulimia nervosa (BN), or those exhibiting dieting behavior will be more inclined to be addicted to exercise compared to participants who display normal eating behaviors. I also predict that the results will differ by gender, with men reporting higher rates of exercise addiction than women. This hypothesis is consistent with the results of Bratland-Sanda et al. (2010).
7. The seventh hypothesis is that participants with symptoms of anorexia nervosa (AN), bulimia nervosa (BN), or those exhibiting dieting behavior will be more inclined to be dependent on exercise compared to participants who display normal eating behaviors. I also predict that the results will differ by gender, with men reporting higher rates of exercise dependence than women. This hypothesis is consistent with the results of Bratland-Sanda et al. (2010).
8. The eighth hypothesis is that individuals with symptoms of AN or BN, or exhibiting dieting behaviors will exercise more frequently than individuals without AN, BN, or dieting behaviors. I predict that the results will differ by gender, with men reporting higher frequencies of exercise. I expect the interaction between gender and EAT-26 groups to be significant. This hypothesis is consistent with the results of Walsh (2011), American Psychiatric Assocation (1994), and Bratland-Sanda et al. (2010).

CHAPTER II

Methods

Participants

All of the participants of the study were students at Middle Tennessee State University (MTSU). Of the 246 participants (*N* = 246), 189 (76.8%) were female and 57 (23.2%) were male. The average age for females was 19.4 years, ranging from 18 to 56, with a standard deviation of 3.3. The average age for males was 20.4, ranging from 18 to 49, with a standard deviation of 4.7. Participants were recruited from the General Psychology Research Pool. The goal was for some particpants to be similar to the norm group based on their reported frequency of exercise, as measured by the Leisure-Time Exercise Questionnaire (LTEQ), and some to be dissimilar with higher reported frequencies of exercise than the norm group. In return for participating in the study, students received course credit.

Materials

The materials for the study were in the form of online surveys built using Qualtrics (Smith, Smith, Smith & Orgill, 2002). The measures included a demographics questionnaire, the Subjective Happiness Scale (Lyubomirsky& Lepper, 1999), the Godin Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985), the Reasons for Exercise Inventory (Silberstein et al., 1988), the Eating Attitudes Test (Garner, Olmsted, Bohr, & Garfinkel, 1982), the Exercise Dependence Scale-21 (Hausenblas & Downs, 2002), and the Exercise Addiction Inventory (Terry et al., 2004). The demographics questionnaire included items pertaining to age and gender.

Subjective Happiness Scale. The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999) is a 4-item measure of a person's overall subjective happiness. In other words, the SHS is a global measure of whether a person reports being happy or unhappy. Being that the SHS is short, it is also practical to use. One item on the scale asks participants to rate their own level of happiness, and another item asks how relatives or peers would rank the respondent's level of happiness. For these items, respondents use a 7-point scale to rate their agreement with the items (1 = *not a very happy person*, 7 = *a very happy person* and 1 = *less happy*, 7 = *more happy*, respectively). The last two items describe characteristics of an unhappy and a happy person. The respondents determine how much the characteristics apply to them. Respondents used a 7-point scale to rate their agreement with the items (1 = *not at all*, 7 = *a great deal*). To score the scale, the 4th item is reverse-coded and the mean of the 4 items is calculated. Higher scores indicate a happy person and lower scores indicate an unhappy person. Mattei and Schaefer (2004) found the SHS to be positively correlated with the two major components of well-being, satisfaction with life and positive affect, with correlations of .66 and .49, respectively. Furthermore, Lyubomirsky and Lepper (1999) found the SHS to have high internal consistency and to be highly reliable. From construct, convergent, and discriminant validity studies performed by Lyubomirsky and Lepper, the SHS was found to be a valid measure of a person's well-being. In the current sample, the internal consistency value was .89.

Leisure-Time Exercise Questionnaire. The Leisure-Time Exercise Questionnaire (LTEQ; Godin & Shephard, 1985) is a 2-item, self-report measure of the frequency of one's exercise habits. For the first item, participants indicate how many

times in the past week they had participated in more than 15 min of mild, moderate, or strenuous exercise. The scores are multiplied by 3, 5, or 9 based on the level of intensity of exercise, respectively, and then summed together for a total score. Mild exercise is characterized by minimal effort activities such as yoga or easy walking; moderate exercise is characterized by activities such as fast walking or easy swimming, activities that are not exhausting; strenuous exercise is characterized by a rapid heartbeat, and includes activities such as running or vigorous swimming. For the second item, participants indicate how often in a typical week they engage in any activity that makes their heart beat rapidly. Respondents rate their agreement to this item by answering either *often, sometimes,* or *never/rarely*. A score of 23 or less indicates an insufficiently active person whereas a score of 24 or more indicates an active person. According to Ng and Jeffery (2003), the LTEQ is a psychometrically validated instrument for measuring the frequency of exercise, with validity coefficients of .83 and .85 validated against body fat and oxygen consumption, respectively; test-retest coefficients for the scale over two weeks were .94 for strenuous exercise, .46 for moderate exercise, and .48 for mild exercise. In the current sample, the internal consistency value was .84.

Reasons for Exercise Inventory. The Reasons for Exercise Inventory (REI; Silberstein et al., 1988) is a 24-item questionnaire inquiring about a person's reasons for participating in exercise activities. Respondents rate the extent to which they agree to the reason for their exercising on a 7-point scale (1 = *not at all important,* 4 = *moderately important*, 7 = *extremely important*). The items are divided into 7 different domains for reasons to exercise: weight control (e.g., *to be slim*), fitness (e.g., *to improve my strength*), health (e.g., *to improve my cardiovascular fitness*), improving body tone (e.g.,

to redistribute my weight), improving overall physical attractivness (e.g., *to improve my appearance*), improving one's mood (e.g., *to cope with sadness or depression*), and enjoyment (e.g., *to meet new people*). The domain with the highest score is indicative of an individual's most important reason for exercising. If there is a tie, it is presumed that the individual exercises for both reasons equally. According to Silberstein et al. (1988), the REI has adequate internal consistency, *alpha* = .82, and a validity coefficient of .88 for the overall scale. In the current sample, the internal consistency value was .87.

Eating Attitudes Test. The Eating Attitudes Test (EAT-26; Garner, Olmstead, Bohr, & Garfinkel, 1982) is a self-report questionnaire designed to measure one's risk of having an eating disorder based on attitudes, feelings, and behaviors characteristic of symptoms related to disordered eating. There are 3 subscales on the EAT-26: dieting (e.g., *I eat diet foods*), bulimia and food preoccupation (e.g., *I vomit after I have eaten*), and oral control (e.g., *I avoid eating when I am hungry*). The rating scale corresponds to the frequency of thinking, feeling, or doing certain things. Respondents rate their agreement to items 1-25 (3 = *always*, 2 = *usually*, 1 = *often*, 0 = *sometimes*, *rarely*, or *never*). For item 26 (*I enjoy trying new rich foods*), respondents rate their agreement to the item (0 = *always*, *usually*, or *often*, 1 = *sometimes*, 2 = *rarely*, 3 = *never*.) Higher scores are indicative of the presence of an eating disorder, and Garner et al. (1982) designated a score of 20 or more to be indicative of a clinical-level eating disorder. According to Thome and Espelage (2004), the EAT-26 is highly reliable with a Cronbach's alpha of .91. The EAT-26 has been extensively used in research, and the normative data are appropriate for the current study (e.g., Thomas and Espelage, 2004). In the current sample, the internal consistency value was .90.

Exericise Dependence Scale. The Exercise Dependence Scale -21 (EDS; Hausenblas & Downs, 2002) is a 21-item self-report questionnaire that characterizes exercise dependence as "maladaptive patterns of exercise leading to clinically significant impairment or distress"(p. 391). Some of the items include: "I exercise to avoid feeling irritable," "I exercise when injured," and "I exercise longer than expected." Participants report their answers on a 6-point scale (1 = *never*, 6 = *always*). The items break down into the following 7 criteria for exercise dependence: withdrawal effects, continuance, tolerance, lack of control, reduction in other activities, time, and intention effects. A person has to display 3 of the 7 symptoms to be labled as having exercise dependency. Hausenblas and Downs (2002) designated a cutoff score of 70 or higher to identify those at-risk for or experiencing exercise dependence. Terry et al. (2004) found the EDS to have reliability ranging from .71 to 92. Mónok et al. (2012) found the EDS to have concurrent validity with the EAI of .81. In the current sample, the internal consistency value was .70.

Exercise Addiction Inventory. The Exercise Addiction Inventory (EAI; Terry et al., 2004) was developed because it is relatively short in nature, making it very practical, and is more theory-driven than some of its counterparts. The EAI is a brief screening tool used to distinguish between those who are at risk for exercise addiction, those who display symptoms of exercise addiction, and those who do not display symptoms of exercise addiction. The short form presents six items related to exercise addiction. Some of the items include: *"Exercise is the most important thing in my life," "I use exercise as a way of changing my mood," and "If I have to miss an exercise session I feel moody and irritable."* The items are rated on a 5-point scale (1 = *strongly disagree*, 5 = *strongly*

agree), with higher scores being indicative of the presence of exercise addiction. The scale authors designated a cut-off score of 24 to mean the presence of exercise addiction, whereas a score ranging from 13 to 23 denoted a person at risk for exercise addiction; anything below 13 is deemed a person as asymptomatic. Mónok et al. (2012) found the EAI to have a good internal reliability coefficient of .84, and a concurrent validity coefficient of .80. In the current sample, the internal consistency value was .84.

Design

The independent variables (IVs) of the study were gender and frequency of regular exercise, as measured by the LTEQ. The dependent variables (DVs) of the study were the participants' subjective well-being, as measured by the SHS, and possible negative results of exercise, measured using the EDS and the EAI. Presence of eating disorders and reasons for exercise were also assessed using the EAT-26 and REI, respectively. A complete intercorrelational matrix was conducted for exploratory purposes, as well as comparative *t*-tests to compare previous samples to the current sample.

Procedure

Once the current study was granted approval from the Institutional Review Board (IRB), the measures were compiled into one survey using Qualtrics (Smith et al., 2002). See Appendix 1 for the IRB approval form. The survey was then uploaded to the SONA System so that General Psychology students could fill out the surveys online in order to receive course credit.

Prior to taking the survey, participants were able to read a brief description of the purposes of the study. Once agreeing participate in the study, students read an informed

consent form which further explained the purposes of the study, risks and benefits associated with participating in the study, and reassurrance that their answers would be kept anonymous. See Appendix 2 for a copy of the consent form. Before continuing with the surveys, participants had to check a box that they understood the aforementioned information and agreed to participate in the study. Once this step was completed, participants indicated whether or not they were at least 18 years of age, to which they had to answer, "*yes*," in order to continue. Participants were encouraged to fully complete the survey and answer honestly.

In order to receive credit for participating in the survey, it was in all capital letters and bolded within the informed consent form that participants would be redirected to another survey where they could enter their name in order to receive credit. Participants were reassured that their responses would not be linked to their name in any way.

CHAPTER III

Results

Descriptive Data

The data consisted of the age, gender, and raw scores from the following scales: Subjective Happiness Scale (SHS), Leisure-Time Exercise Questionnaire (LTEQ), Reasons for Exercise Inventory (REI), Eating Attitudes Test-26 (EAT-26), Exercise Dependence Scale (EDS), and the Exercise Addiction Inventory (EAI). Table 1 shows descriptive statistics for the major measures. Table 2 and Table 3 show descriptive statistics for the raw scores of the aforementioned scales separated by gender.

SHS scores were split into low, medium, and high scores based on norms as suggested by Lyubomirsky and Lepper (1999). A score of 4.75 or less represented a low score (n = 67), 4.76 to 5.50 represented a medium score (n = 88), and 5.50 or higher represented a high score (n = 63), with higher scores being indicative of higher well-being. Scores on the LTEQ were also split into low, medium, and high frequencies of exercise based off of norms suggested by Godin and Shephard (1985). Low scores ranged from 0 to 39 (n = 100), medium scores ranged from 40 to 69 (n = 103), and 70 or higher representing a high frequency of exercise (n = 43).

EAT-26 scores of 20 or higher represented the presence of disordered eating (Garner et al., 1982). In the current study, there were 28 participants with scores of 20 or higher on the EAT-26. The EDS was used to assess exercise dependence. A cutoff score of 70 or higher was used to designate those at-risk or with exercise dependence (Hausenblas & Downs, 2002). In the current study, there were 36 participants with scores of 70 or higher on the EDS.

The authors of the EAI designated a cutoff score of 24 to mean the presence of exercise addiction (Terry et al., 2004). There were 8 participants in the current study with scores of 24 or higher on the EAI.

Table 1

Descriptive Statistics for Scales, Full Sample

Scale	Mean	*SD*
SHS	5.08	0.97
LTEQ	49.92	35.82
EAT-26	9.75	9.11
EDS	48.28	20.21
EAI	13.28	5.07

Note. $N = 246$; REI responses are not included in descriptive statistics because *M* and *SD* are not calculated for this scale, but rather a category for a reason for exercising was determined for each participant.

Table 2

Descriptive Statistics for Scales, Women Only

Scale	Mean	*SD*
SHS	5.12	0.95
LTEQ	46.31	29.46
EAT-26	10.37	8.71
EDS	46.01	19.19
EAI	12.81	4.90

Note. $n = 189$; REI responses are not included in descriptive statistics because *M* and *SD* are not calculated for this scale, but rather a category for a reason for exercising was found for each participant.

Table 3

Descriptive Statistics for Scales, Men Only

Scale	Mean	*SD*
SHS	4.95	1.01
LTEQ	61.91	50.11
EAT-26	7.72	10.13
EDS	55.79	21.80
EAI	14.81	5.36

Note. $n = 57$; REI responses are not included in descriptive statistics because *M* and *SD* are not calculated for this scale, but rather a category for a reason for exercising was found for each participant.

Six one-sample *t* tests were conducted in order to compare the current sample to the previous sample for each questionnaire. For the SHS prior sample, $M = 4.89$, $SD = 1.11$. For the full SHS present sample, $M = 5.08$, $SD = 0.97$. These means differed significantly: $t_{(245)} = 3.06$, $p = .002$. For the LTEQ previous sample, $M = 44.95$, $SD = 27.62$. For the full LTEQ present sample, $M = 49.92$, $SD = 35.82$. These means differed significantly: $t_{(245)} = 2.18$, $p = .030$. For the EAT-26 prior sample for males, $M = 3.87$, $SD = 3.88$. For the present EAT-26 sample of males, $M = 7.72$, $SD = 10.13$. These means differed significantly: $t_{(56)} = 2.87$, $p = .006$. For the EAT-26 previous sample of females, $M = 8.24$, $SD = 7.44$. For the present EAT-26 sample of females, $M = 10.37$, $SD = 8.71$. These means differed significantly: $t_{(188)} = 3.35$, $p = .001$. For the EDS previous sample, $M = 41.18$, $SD = 22.60$. For the full EDS present sample, $M = 48.28$, $SD = 20.21$. These means differed significantly: $t_{(245)} = 5.50$, $p < .001$. For the prior EAI sample, $M = 14.17$, $SD = 4.64$. For the full EAI present sample, $M = 13.28$, $SD = 5.07$. These means differed significantly: $t_{(245)} = -2.76$, $p = .006$.

Testing the Hypotheses

For all hypotheses an alpha value of .05 was required for statistical significance. The first hypothesis was that the measures of well-being, frequency of exercise, and presence of disordered eating or disordered dieting behavior would be significantly correlated. The correlation matrix for these measures is presented in Table 4. Of the 21 expected significant relationships, 9 were found to be significant. There was a significant negative correlation between SHS and EAT-26 scores: $r = -.13$, $p = .046$, meaning that people with an eating disorder are less happy than people without an eating disorder. And there was a significant positive correlation between LTEQ and EDS scores: $r = .30$, $p < .001$; there

was also a significant positive correlation between LTEQ and EAI scores: $r = .29$, $p < .001$. Additionally, there was a significant positive correlation between low, medium, or high frequency of exercise and EDS: $r = .34$, $p < .001$. There was also a significant positive correlation between low, medium, or high frequency of exercise and EAI: $r = .30$, $p < .001$. There was a significant positive correlation between EAT-26 and EDS: $r = .33$, $p < .001$. There was also a significant positive correlation between EAT-26 and EAI: $r = .35$, $p < .001$. Finally, there was a significantly strong positive correlation between EDS and EAI: $r = .80$, $p < .001$. Therefore, the results only provide partial support of the hypothesis.

Table 4

Correlational Matrix of All Scales, Full Sample

	Age	SHS	LTEQ	LMH	EAT-26	EDS	EAI
Age		*ns*	*ns*	*ns*	*ns*	*ns*	*ns*
SHS	*ns*		*ns*	*ns*	$r = -.13$ $p = .046$	*ns*	*ns*
LTEQ	*ns*	*ns*		$r = .797$ $p < .001$	*ns*	$r = .30$ $p < .001$	$r = .30$ $p < .001$
LMH	*ns*	*ns*	$r = .797$ $p < .001$		*ns*	$r = .34$ $p < .001$	$r = .30$ $p < .001$
EAT-26	*ns*	$r = -.13$ $p = .046$	*ns*	*ns*		$r = .33$ $p < .001$	$r = .35$ $p < .001$

Note. $N = 246$.

The second hypothesis was that the three measures (well-being, frequency of exercise, and presence of disordered eating or dieting behavior) would differ by gender. An Independent samples *t* tests were conducted to test whether women and men differed for well-being, frequency of exercise, and presence of disordered eating or dieting behavior. Analyses indicated that men (M = 61.91, SD = 50.11) reported significantly higher levels of exercise frequency than women (M = 46.31, SD = 29.46), $t_{(244)} = 2.93$, $p = .014$. No significant gender differences were found for the SHS and EAT-26 measures. Refer to Tables 2 and 3 for complete descriptive statistics of the scales separated by gender. Therefore, the results provide only partial support of the hypothesis.

To test the third hypothesis, well-being scores for the non-disordered eating participants were compared on gender and exercise frequency. The hypothesis was that a gender difference would exist among this group, such that men would have higher well-being scores and higher frequencies of exercise than women. A 3x2 ANOVA was conducted using the high, medium, and low groups on the frequency of exercise measure, and gender as the independent variables, with reported well-being as the dependent variable. There was not a main effect for exercise frequency, $F_{(2, 240)} = 2.07$, *ns*. Likewise there was not a significant gender effect, $F_{(1, 240)} = 2.26$, *ns*. Finally, the interaction between frequency of exercise and gender was also not significant, $F_{(2, 240)} = .59$, *ns*. Thus, hypothesis 3 was not supported. Refer to Tables 5 and 6 for descriptive statistics of SHS scores for men and women, respectively.

Table 5

Descriptive Statistics of SHS Scores for Non-Disordered Men

LMH	*M*	*SD*	*n*
1	4.67	1.07	17
2	5.17	.85	23
3	4.93	1.13	17

Table 6

Descriptive Statistics of SHS Scores for Non-Disordered Women

LMH	*M*	*SD*	*n*
1	5.00	.87	83
2	5.18	.93	80
3	5.28	1.22	26

The fourth hypothesis was that women and men would report differences in reasons for exercising. The hypothesis was that women would report a greater tendency to exercise for weight control than men and that men would report a greater tendency to exercise for mood regulation than women. Participants' answers for the REI portion of the survey were divided into 7 different categories depending on their answers (1 = *weight control*, 2 = *fitness*, 3 = *mood enhancement*, 4 = *health*, 5 = *attractiveness*, 6 = *enjoyment*, 7 = *tone*). A Chi Square (X^2) analysis was conducted to test this hypothesis:

$X^2 = 21.87$, $p = .001$. I conclude this to mean that women exercise significantly more than men for weight control and men exercise significantly more than women for mood regulation. A frequency count was conducted to assess whether women exercise for weight control more than men and whether the genders differ on any other reasons. Results from the frequency count showed that 29.1% ($n = 55$) of women exercised for weight control whereas 10.5% of men ($n = 6$) exercised for weight control. Weight control was the most frequently reported reason for exercising for females, whereas men most frequently reported exercising for fitness ($n = 12$, 21.1%). Tables 7 and 8 display the frequency (n) and percent of participants in each category of reasons for exercising, separated by men and women, respectively. Therefore, the results were in support of the hypothesis.

Table 7

Descriptive Statistics for REI Scores, Men Only

Reason for Exercise	Frequency (*n*)	Percent
1- Weight Control	6	10.5
2- Fitness	12	21.1
3- Mood Enhancement	9	15.8
4- Health	11	19.3
5- Attractiveness	11	19.3
6- Enjoyment	4	7.0
7- Tone	4	7.0

Note. $n = 57$.

Table 8

Descriptive Statistics for REI Scores, Women Only

Reason for Exercise	Frequency (*n*)	Percent
1- Weight Control	55	29.1
2- Fitness	31	16.4
3- Mood Enhancement	25	13.2
4- Health	48	25.4
5- Attractiveness	12	6.3
6- Enjoyment	2	1.1
7- Tone	16	8.5

Note. n = 189.

A Chi Square (X^2) analysis was conducted for the fifth hypothesis to see if individuals with different well-being scores (high vs. medium vs. low), as measured by the SHS, report more or less eating disorders, as measured by scores of 20 or more on the EAT-26, across genders. Reported eating disorders was the dependent variable. The chi-square test allowed me to test whether the observed proportions for a categorical variable differ. I wanted to test whether the observed proportions from the current sample differed significantly. There was a significant association between the 3 SHS groups (low, medium, or high) and the 2 EAT-26 groups (scores of 20 or more and scores of 19 or lower): $X^2 = .22$, $p = .002$. Thus, I concluded that they do differ. The results of this analysis supported the fifth hypothesis. See Table 9 for the counts in each group.

Table 9

Number of Participants in Each Group Divided by SHS Level and EAT-26 Scores

	SHS		
	Low	Medium	High
EAT-26 $<$ 20	67	88	63
EAT-26 $\geq$ 20	18	6	4

Note. N = 246.

The sixth hypothesis was that participants with anorexia nervosa (AN), bulimia nervosa (BN), or those exhibiting dieting behavior would be more inclined to be addicted to exercise or dependent on exercise compared to participants who display normal eating behaviors, and that men would report higher exercise addiction scores. This hypothesis was tested using a 2 (gender) x2 (EAT-26 groups) ANOVA using EAI scores as the dependent variable (see Table 10 and 11). There was a significant disordered eating effect for EAI scores: $F_{(1, 242)} = 7.15$, $p = .008$, with men ($M = 14.81$, $SD = 5.36$) scoring higher than women ($M = 12.81$, $SD = 4.90$). There was also a significant association between the 2 EAT-26 groups (scores of 20 or more and scores of 19 or lower) and EAI scores: $F_{(1, 242)} = 14.77$, $p < .001$, with the higher EAT-26 group ($M = 16.68$, $SD = 6.14$) scoring higher than the lower EAT-26 group ($M = 12.84$, $SD = 4.76$). The interaction between gender groups and EAT-26 groups was not significant: $F_{(1, 242)} = 1.53$, *ns*. The results are in support of the hypothesis. Tables 10 and 11 provide descriptive statistics for this hypothesis divided by men and women, respectively.

Table 10

Descriptive Statistics For EAI Scores Divided by EAT-26 Scores, Men Only

	M	*SD*	*n*
EAT-26 < 20	14.3	4.9	53
EAT-26 ≥ 20	21.3	7.8	4

Note. $n = 57$.

Table 11

Descriptive Statistics for EAI Scores Divided by EAT-26 Scores, Women Only

	M	*SD*	*n*
EAT-26 < 20	12.4	4.6	165
EAT-26 ≥ 20	15.9	5.7	24

Note. $n = 189$.

The seventh hypothesis was that participants with AN, BN, or dieting behaviors would report being more dependent on exercise than individuals without AN, BN, or dieting behaviors, and that men would report higher exercise dependence scores. This hypothesis was tested using a 2 (gender) x2 (EAT-26 groups) ANOVA using EDS scores as the dependent variable (see Table 12 and 13).There was a significant gender effect for EDS scores: $F_{(1, 242)} = 7.47$, $p = .007$, with men ($M = 55.79$, $SD = 21.80$) reporting greater dependence scores than women ($M = 46.01$, $SD = 19.19$). There was also a significant disordered eating effect on EDS scores, $F_{(1, 242)} = 13.23$, $p < .001$, with those with higher EAT-26 scores ($M = 61.75$, $SD = 22.55$) reporting more exercise dependence than those

with lower EAT-26 scores (M = 46.55, SD = 19.27). The interaction between gender and EAT-26 groups was not significant: $F_{(1, 242)}$ = .79, *ns*. The results are in partial support of the hypothesis.

Table 12

Descriptive Statistics for EDS Scores Divided by EAT-26 Scores, Men Only

	M	*SD*	*n*
EAT-26 < 20	54.1	21.0	53
EAT-26 ≥ 20	78.5	21.4	4
Total	55.8	21.8	57

Note. n = 57.

Table 13

Descriptive Statistics for EDS Scores Divided by EAT-26 Scores, Women Only

	M	*SD*	*n*
EAT-26 < 20	44.1	18.1	165
EAT-26 ≥ 20	59.0	21.9	24
Total	46.0	19.2	189

Note. n = 189.

According to the final hypothesis, individuals with scores of 20 or above on the EAT-26, separated by male and female, would report higher levels of exercise frequency

than those below the cutoff point, as measured by the LTEQ (the DV), and that men would report higher frequencies of exercise. This hypothesis was tested using a 2 (gender) x2 (EAT-26 groups) ANOVA using LTEQ scores as the dependent variable (see Table 14). There was a significant gender effect on LTEQ scores: $F_{(1, 242)} = 16.58$, $p < .001$, with men ($M = 61.91$, $SD = 50.11$) reporting higher frequencies of exercise than women ($M = 46.31$, $SD = 29.46$). There was not a significant disordered eating effect, $F_{(1, 242)} = 3.46$, *ns*. However, the interaction between gender and EAT-26 groups was significant: $F_{(1,242)} = 8.73$, $p = .003$. Therefore, the results are in support of the hypothesis. Refer to Table 14 for descriptive statistics for the interaction effect between gender and EAT-26 groups.

Table 14

Descriptive Statistics for Interaction between Gender and EAT-26 Groups

	EAT-26	
Gender	≤ 19	≥ 20
1- Male	*n* = 53	*n* = 4
	M = 58.60	*M* = 105.75
	SD = 48.07	*SD* = 63.71
2- Female	*n* = 165	*n* = 24
	M = 47.67	*M* = 36.96
	SD = 28.96	*SD* = 31.77

CHAPTER IV

Discussion

Individuals exercise for a variety of reasons (Silberstein et al., 1988) that are typically associated with positive physical (Haskell et al., 2007) and mental (Catellier & Yang, 2013) health benefits. However, if an individual exercises to damaging degrees and without limits, it can be detrimental to his or her physical or mental health (Fredericson & Misra, 2007; Hausenblas & Downs, 2002; Terry et al., 2004). Detrimental physical health effects from exercising too much can come in the form of injuries (Fredericson & Mirsa, 2013), whereas detrimental mental health effects can cause exercise dependence or exercise addiction (Hausenblas & Downs, 2002; Terry et al., 2004). Furthermore, individuals exhibiting anorexia nervosa or bulimia nervosa often have negative mental health characteristics such as anxiety or depression (Eisenberg et al., 2011). And, a characteristic of anorexia nervosa and bulimia nervosa could be excessive exercise (American Psychiatric Assocation, 1994; Walsh, 2011). The current study sought to examine how well-being, frequency of exercise, and the presence of anorexia nervosa, bulimia nervosa, or disorderedly dieting behavior correlate with the likelihood of an individual becoming dependent on or addicted to exercise.

Hypotheses

Negative results are difficult to interpret for several reasons. One reason may be that the scales used to measure the results might not have been effective (i.e., not reliable, not sensitive, not a valid representation of what is supposed to be measured). Another reason for lack of support for hypotheses may be the characteristics of the participants. The participants may not have been intrinsically motivated enough to answer the survey

questions completely, honestly, or accurately. Also, negative results could be the product of valid results truly not representing a difference.

Hypothesis 1. For the first hypothesis, I was interested in how well-being, frequency of exercise, and presence of disordered eating were correlated. Results indicated that there was a negative correlation between well-being and the presence of disordered eating, which was in support of the hypothesis and consistent with the results of Thome and Espelage (2004). There was also a significant positive correlation between frequency of exercise and exercise dependence, as well as exercise addiction. This intuitively makes sense; as Hausenblas and Downs (2002) found, if one is addicted or dependent on exercise, he or she tends to exercise more.

Likewise there was a significant positive correlation between the EDS and the EAI, which was consistent with research that the EDS has high concurrent validity with the EAI (Mònok et al., 2012). There was a significant positive correlation between disordered eating and exercise dependence, as well as a positive correlation between disordered eating and exercise addiction. These relationships suggest that when an eating disorder is present, the affected person is more inclined to be dependent on exercise or addicted to exercise. This is consistent with results from Bratland-Sanda et al. (2010), although their sample included inpatients receiving treatment for an eating disorder, not college students.

Hypothesis 2. The second hypothesis was that well-being, frequency of exercise, and the presence of disordered eating would differ by gender. More specifically, I was interested in whether or not women would report the presence of an eating disorder more than men, ultimately causing women to report lower well-being scores and higher

frequencies of exercise. Results revealed that the genders only differed significantly in frequencies of exercise, not for well-being or the presence of disordered eating . I found that men exercise more than women. It appears that women in the sample did not report more eating disorders than men, and thus did not to report significantly lower well-being scores. Therefore, the results are not in support of the hypothesis and inconsistent with the findings of Thome and Espelage (2004).

Hypothesis 3. The third hypothesis dealt only with participants reporting normal eating behaviors. I was interested in whether or not men who reported normal eating would have higher well-being scores and higher frequencies of reported exercise than women who also reported normal dietary habits. When well-being was the dependent variable, there was not a significant main effect for frequency of exercise or gender and no significant interaction of frequency of exercise and gender. This suggests that in the absence of an eating disorder, men do not report exercising significantly more than women. Likewise men failed to report significantly higher well-being scores than women. However, when considering the entire sample (e.g., Hypothesis 2) men reported higher frequencies of exercise, further alluding to excessive exercise being characteristic of an eating disorder (American Psychiatric Association, 1994; Bratland-Sanda et al., 2010; Walsh, 2011). Thus, the results are not in support of the hypothesis and inconsistent with the findings of Silberstein et al. (1988).

Hypothesis 4. The fourth hypothesis was that men and women would report exercising for different reasons. More specifically, I expected women to report exercising for weight control more than males and for males to report exercising for mood regulation more than females. These results were in support of the hypothesis, and the

results are consistent with findings from Silberstein et al. (1988) and thus my conclusions are evident. However, I did not expect any other differences to be significant in regards to reasons for exercising between males and females. Surprisingly my results found that men exercise more than women to be attractive and because they enjoy it more. Therefore, these results are partially in support of the hypothesis because there were more differences that originally expected. However, the findings are important to note.

Hypothesis 5. For the fifth hypothesis, I expected that individuals with an eating disorder or disorderd dieting habits would report lower well-being scores than individuals without an eating disorder. Results concluded that there was a significant association between low, medium, and high well-being groups and individuals exhibiting an eating disorder. I conclude this to mean that individuals with an eating disorder exhibit lower well-being whereas individuals not exhibitng an eating disorder report higher well-being. Thus, the results are in support of the hypothesis and are consistent with findings from Eisenberg et al. (2011) and Walsh (2011).

Hypothesis 6. The sixth hypothesis was that individuals exhibiting an eating disorder or unhealthy dieting would be more inclined to be addicted to exercise than those without an eating disorder or reporting unhealthy dieting. Results indicated that gender and individuals with disordered eating both had a significant association with exercise addiction. This is in support of the hypothesis and consistent with results form Bratland-Sanda et al. (2010). However, there was not an interaction of gender and eating disorders with exercise addiction Expanding on the results of Bratland-Sanda et al. (2010), current results indicated that there was a gender main effect, with men reporting higher exercise addiction scores. I found that if men have an eating disorder, he will be

more inclined to be addicted to exercise compared to peers who do not have an eating disorder and are not dieting.

Hypothesis 7. Similar to the sixth hypothesis, the seventh hypothesis addressed whether or not those exhibiting an eating disorder would be more inclined to be dependent on exercise than those without an eating disorder or disordered dieting behavior. Results of this hypothesis were similar to the previous hypothesis in that both gender and the presence of an eating disorder had a significant association with exercise dependence. However, the interaction between eating disorders and gender was not significant. Expanding on results found by Bratland-Sanda et al. (2010), current results indicate that there was a gender main effect, with men reporting higher exercise dependence scores. I found that if men have an eating disorder, he will be more inclined to be dependent on exercise compared to peers who do not have an eating disorder. The results are in support of the hypothesis.

Hypothesis 8. For the last hypothesis, I was interested in whether or not individuals with an eating disorder or disordered dieting behavior would exercise more frequently than individuals without an eating disorder. First of all, it is important to recognize that there was a significant difference between men and women in regards to the amount of exercise each gender reported. Referring back to the second hypothesis, one can see that men report exercising significantly more than women. From the current hypothesis, males reported much more exercise than females including when an eating disorder was present. Furthermore, the interaction effect was significant. All in all, I concluded that similar to American Psychiatric Association (1994), Bratland-Sanda et al. (2010), and Walsh (2011), individuals with an eating disorder (regardless of gender)

report significantly higher frequencies of exercise than individuals not exhibiting disordered eating. This finding is in partial support of the hypothesis.

Conclusions

This study was conducted because I wanted to see how well-being, eating disorders, and frequency of exercise relate to one another. Specifically, in regards to frequency of exercise, I was interested to see if individuals exhibiting an eating disorder would be more inclined to be addicted to exercise or dependent on exercise than individuals not exhibiting disordered eating behaviors. By completing the study, I learned that previous studies were verified. For instance, consistent with Thome and Espelage (2004), results of the current study showed that there was a negative correlation between well-being and the presence of an eating disorder; that is, when an individual has an eating disorder, his or her well-being is lower than an individual who does not have an eating disorder. However, in partial contradiction of the work of Thomas and Espelage, the fact that the study did not find a higher correlation between eating disorders and well-being suggests that there is not as big of a difference as one might think. Also, consistent with Silberstein et al. (1988), one would expect men to exercise more than women. The present study expanded that finding by determining that men exercised more than women for the entire sample but not for the sample when participants reporting problem eating behaviors were removed. Furthermore, studies have shown that men exercise more than women for mood regulation and woman exercise more for weight control (Silberstein et al., 1988), as did the current study. However, the current study also showed that men exercise more for attractiveness and enjoyment than women do.

Limitations

In succession of the one-sample *t* tests, each proved to be significant, meaning that the current group differed from prior studies. Perhaps the current mean SHS score was significantly higher than the comparative group mean because the college students in the current study were receiving class credit for participating whereas the adult Russians used in Lyubominsky and Lepper's (1999) study were volunteer participants. The current LTEQ mean may have been significantly higher than the comparative sample LTEQ mean because the comparative sample retired military personnel, and college students may have more time to exercise than retired military personnel. The current EAT-26 mean scores for men and women were significantly higher than the comparative sample. Since both samples were undergraduate student participants, perhaps the difference can be attributed to the fact that Silberstein et al. (1988) used a much smaller sample than the current sample. Perhaps the current EDS mean was significantly higher than the sample used by Mònok et al. (2012) because the comparative sample employed Hungarians between the ages of 18 and 64, and college students from the United States may exercise more than adults from Hungary over the life span. The same can be said for the difference between the current EAI and the comparative EAI mean as the comparative mean was drawn from Mònok et al. (2012).

Another limitation of the current study is that the sample consisted of General Psychology students at Middle Tennessee State University. Therefore, the sample did not represent a random sample of the population. The sample was not only limited by convenience, but also because the age of participants was limited. Because the sample was not random, the results provide limited generalizability. Another limitation of the

study is that variables such as race and ethnicity were not measured, and could have served as moderating variables, possibly affecting the results of the study. Finally, a limitation that is clear from the current study is that the instruments were quite culture and sample-specific.

Directions for Future Research

Although not all hypotheses of the study were confirmed, the study still contributed useful implications for research. For future research, someone could use college students to follow up the current study to compare mean scores to the scores found here. This would permit generalization of the findings. A broader sample may allow researchers to make inferences and draw conclusions about different age ranges other than undergraduate college students. Also, future research could analyze race and ethnicity to see how those variables play a role in the amount of exercise one performs, well-being, and eating behaviors.

The current study could be expanded by having an intervention component. For instance, an intervention component could be included on what would help people to have better mental health and to experience less stress. Finally, future research could use the transtheorectical model to assess what stage of change participants are in with regards to exercise and weight management (Macchi, Russell, & White, 2013). Stages of change would be important to assess because a person in the maintenance stage may exercise for different reasons than somone in the action stage.

Findings relating well-being and frequency of exercise could be expanded with a larger sample and by including participants with a wide range of reported exercise habits. Future studies would want to address clinical samples of people with eating disorders. As

gender differences were not as pronounced as expected in the present study, future studies ought to continue to investigate these questions. Perhaps more detailed well-being and frequency of exercise measures would improve future studies.

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APPENDICES

Appendix 1: IRB Approval Page

October 14, 2013

Emily Hopkins, Dr. James Rust Department of Psychology

Dear Investigator(s),

The MTSU Institutional Review Board, or a representative of the IRB, has reviewed the research proposal identified above. The MTSU IRB or its representative has determined that the study poses minimal risk to participants and qualifies for an expedited review under 45 CFR 46.110 and 21 CFR 56.110, and you have satisfactorily addressed all of the points brought up during the review.

Approval is granted for one (1) year from the date of this letter for 300 participants.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918. Any change to the protocol must be submitted to the IRB before implementing this change.

You will need to submit an end-of-project form to the Office of Compliance upon completion of your research located on the IRB website. Complete research means that you have finished collecting and analyzing data. **Should you not finish your research within the one (1) year period, you must submit a Progress Report and request a continuation prior to the expiration date.** Please allow time for review and requested revisions. Failure to submit a Progress Report and request for continuation will automatically result in cancellation of your research study. Therefore, you will not be able to use any data and/or collect any data. Your study expires October 14, 2014.

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to complete the required training.

All research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.

Sincerely,

Kellie Hilker□Compliance Officer/ MTSU Institutional Review Board Member

Appendix 2: Consent Page

Too Much Exercise: Negative Correlates of Exercise among College Students

Informed Consent

Introduction/Purpose: Emily Hopkins and Dr. James Rust in the Department of Psychology at Middle Tennessee State University are conducting a study to understand the negative correlates of exercise. This study is attempting to find relationships between wellbeing, frequency of exercise, reasons for exercising, eating behavior, gender, exercise dependence, and exercise addiction.

Procedures: If you agree to participate in this study, you will be asked to complete a 15-30 minute online survey at your convenience on a computer of your choice. The questions in this survey focus on wellbeing, frequency of exercise, reasons for exercising, eating behavior, exercise dependence, and exercise addiction. Questions pertaining to age, gender, and socioeconomic status will also be included.

Risks: There are minimal risks to this study. If you feel uncomfortable answering a question you may skip the question(s) and proceed with the questionnaire. There is no risk of being identified as a research participant.

Benefits: There may not be any direct benefits to you from participating in this study; however, you may benefit from the opportunity to reflect on your experience.

Explanation and offer to answer questions: If you have any questions, concerns, complaints, or research-related problems, please contact Emily Hopkins at (740) 935-5009 or by e-mail at elh4h@mtmail.mtsu.edu.

Compensation: To thank you for your participation in this research, you will received one research credit towards fulfilling the participation in research requirement for your introductory psychology course.

Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence.

Confidentiality: All survey responses will be kept confidential, consistent with federal and state regulations. Only the investigators will have access to the data, which will be downloaded and stored on a password-protected computer.

IRB Approval Statement: The Institutional Review Board (IRB) for the protection of human participants at MTSU has reviewed and approved this research study. If you have any questions or concerns about your rights or think the research may

have harmed you, you may contact the IRB Administrator at compliance@mtsu.edu. If you have a concern or complaint about the research and you would like to contact someone other than the research team, you may contact the IRB Administrator to obtain information or to offer input.

Copy of Consent: Please print a copy of this informed consent for your files.

Emily Hopkins, Student Investigator
Dr. James Rust, Principal Investigator