International Journal of Business in Sports, Tourism & Hospitality Management
https://www.gaics.org/Journal/JBSM

Assessment of Motivation and Grit in Individuals Who Exercise at a Division II Fitness Facility

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Abstract

While it has been well-established that participating in regular exercise has many health benefits, including stress relief and decreasing the risk of cancer and heart disease, according to the Centers for Disease Control and Prevention (CDC), only 20.6% of adults are exercising the recommended 150 minutes per week. Having all the information on the numerous benefits of regular exercise readily available to the general public does not serve as sufficient enough motivation to increase the number of people who exercise. Motivation is a critical component of sustained participation in exercise. Increasing research has been done to explore the reasons why individuals are motivated to exercise. More recently, a noncognitive trait, grit, defined as the perseverance and passion for long-term goals, has also been explored for its role in exercise. A woman by the name of Angela Duckworth has focused her life's work on defining and expanding the concept of "grit." Grit is a psychological trait used to measure a person's passion for a particular long-term goal or end state. Grit entails working strenuously toward challenges, and maintaining effort and interest over years despite failures, adversity, and plateaus in progress (Duckworth, 2007). Literature reveals that an individual's grit level may vary depending on several different factors, like age, gender, and education level.

Keywords: assessment, motivation, grit, division II fitness facility

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1.Introduction

Over the last few decades, society has progressed and made drastic improvements, especially concerning the science and medical fields. These improvements have led to a dramatic increase in average life expectancy. Babies that were born in the early 1900s were deemed lucky to live to fifty, while babies born today can expect to live until their late 70's even early 80s in most countries (Global Health and Aging, 2015). Although improvements in the medical field have increased the number of years in a person's life, they have not necessarily increased the quality of a person's life. However, participating in regular exercise or physical activity can increase the quality of an individual's life in a plethora of ways. Exercise can help alleviate stress, tension, and feelings of depression or anger. It can help reduce a person's chances of developing heart disease, and cancer and decrease their risk of having a stroke (Global Health and Aging, 2015). Researchers at the Centers for Disease Control and Prevention (CDC) analyzed survey data collected from more than 450,000 U.S. adults ages 18 and older and they found that only 20.6% met the total recommended amounts of exercise. Knowing the numerous benefits of exercise readily available to the public is not sufficient enough motivation to get people to regularly exercise (CDC, 2013).

According to the International Health Racquet and Sports Club Association, over 55.3 million Americans owned a gym membership in 2015 (IHRSA, 2016). This means that at some point in time something motivated these 55.3 million people to go out and join a gym. Motivation plays a vital role in everyday life. It has the power to dictate and control our daily actions, feelings, and behaviors. The source of motivation is unique and particular to the person. The goal of this research paper is to discover what motivational factors influence people to exercise, specifically at the James G. Mill Center of Health and Fitness at Indiana University of Pennsylvania. Another aim of this paper is to figure out how the age, education level, and gender of these individuals impact their motivation. The last aim of this paper is to investigate the relationship between grit, a non-cognitive trait that allows someone to pursue long-term, challenging goals with passion (Duckworth, 2013), and exercise among the members of this fitness facility.

This research from this study may be pertinent for fitness center managers everywhere. The ability to meet the demands of customer satisfaction is essential for facility managers in the growing competitive fitness industry and this information can help managers do just that (Theodorakis, Alexandris, Rodriguez & Sarmento, 2004). The information garnered from this study can be used to increase exercise among individuals. Having a good grasp on how individuals are motivated to exercise will allow a facility manager to implement the proper equipment, classes, and services to attract more clientele. Understanding these motives will also allow a fitness facility manager to foster an environment where customers are reaching their goals, which ultimately leads to higher customer satisfaction. A study conducted by Molanorouzi in 2015, found results extremely similar to the researchers' hypothesis. His study involved

separating 1,360 adults into two focus groups. Younger adults were categorized as participants ages 21-40 while older adults were between the ages of 41-60. This study found that; college-aged male students were motivated most by intrinsic factors like strength, competition, and challenge. Female college-aged students, on the other hand, were more motivated by extrinsic factors like weight management and improving overall appearance. His evaluation of the older generation showed that men were motivated by status and challenge while females were more concerned with health benefits and overall appearance (Molanorouzi, Khoo, & Morris, 2015). A study conducted by Campbell in 2001 focused more on the relationship between exercise motivation and age. Respondents were asked to evaluate each motivational factor both on its importance as a personal goal and on how much they thought personal exercise could help them achieve these goals. This study found significant differences between age groups. Campbell concluded that one of the most significant differences is that 85% of younger adults ranked maintaining or improving their health as one of their most motivational factors compared to 72% of older adults. Significantly fewer adults felt that this factor was an important personal goal because they believe that it is too late for them to prevent illness (Campbell, MacAuley, & McCrum, 2001). These studies provide evidentiary support that reveals the large impact age and gender have on motivation.

1.1 Research Questions

1. What subscale of motivation from the BREQ-3 influences people to exercise the most?
2. Are there any significant differences between gender, age, and educational level in regards to an individual's overall RAI score and total grit score?

1.2 Hypothesis

1. Members of the fitness center report higher levels of intrinsic motivation.
2. Women will report higher levels of external regulation.
3. Younger individuals will report higher levels of external regulation.
4. Females will report having a higher level of grit than males.

1.3 Significance of the Study

Managers of a fitness facility need to have an understanding of the motives that influence people to join a gym and regularly exercise. These motives may vary depending on the age and gender of the members. Having a good grasp on these motives can allow a facility manager to implement specific workout equipment, classes, or services to attract more customers. They will be able to increase profits by alluring and retaining specific target populations. For example, if it is a known fact that the number one reason female customers ages 20-30 exercise is to lose weight, a manager can implement a high-intensity fat burning class to attract this specific group of people. The results of this study will also help a manager create higher customer satisfaction among clients. If managers know what motivates

clients to exercise, they can use that information to help clients set exercise goals and create a plan for success. There have been numerous studies conducted on the correlation between motivation and exercise but what makes this study unique is the study sample the researchers are focusing on. The current body of literature involves a lot of studies focusing on commercial gyms, division I facilities, or random populations. The researchers in this study are focusing on members of a division II university fitness facility. Another unique aspect of this study is the measurement of grit. The number of studies on grit and exercise is very limited, especially in a university-based facility.

2.Review of Literature

This review of literature will first discuss the concept of motivation and its influence on getting people to participate in regular exercise. According to the International Health Racquet and Sports Association, over 55.3 million Americans owned a gym membership in 2015 (IHRSA, 2016). This means that at some point in time something motivated these 55.3 million people to go out and join a gym. The principal investigator of this study is interested in finding out what motivational subscales (according to the BREQ-3) influence members of the James G. Mill fitness center at Indiana University of Pennsylvania to exercise. Research from past studies reveals that demographic variables such as age, gender, and education level of an individual may impact their motivation levels. This review of literature will also discuss the impact grit has in terms of influencing individuals to exercise.

To do this efficiently and effectively, the researchers must garner information on several different subjects and terms. The first thing to discuss is the concept of exercise motivation. The researchers need to know how motivation affects an individual and what specific factors are most influential in getting people to exercise according to the literature available. Past research has found that when individuals establish their own fitness goals they are more likely to do what it takes to achieve them. Therefore, the researchers must look into self-determination theory and its impact on exercise. Intrinsic and extrinsic motivation also plays a vital role in exercise adherence and goals. The researchers must also look into the impact of age and gender on motivational factors that influence people to exercise. Lastly, the researchers must attempt to discuss the concept of grit and the effect it has had on getting people to exercise in the past.

2.1 Exercise Motivation

According to the CDC regular physical activity is one of the most important things a person can do to increase health benefits. Exercise can help control weight, strengthen bones and reduce one's chance of developing serious diseases (CDC, 2011). The beneficial effects of exercise on the body are reflected by improvement in our overall health. Exercise can also help to release negative feelings of tension, can increase energy levels, and promotes productivity. Physical activity also helps improve coordination, flexibility, and agility and combat sedentary lifestyles and obesity (Valentina, 2016). Although there is a significant amount of research showing a direct correlation between exercise and increased health benefits,

there are still many people that remain sedentary or do not participate in regular physical activity. Although knowledge of these benefits shows just how vital exercise is, it is not sufficient enough to get people to participate in a regular exercise regime. People lack the necessary motivation and drive needed to participate in physical activity.

Motivation is defined by Webster's dictionary as; "the reason or reasons one has for behaving or acting in a particular way." Motivation plays a vital role in everyday life. It has the power to dictate and control our daily actions, feelings, and behaviors. The source of motivation is unique and particular to the person and can help them establish develop and achieve goals throughout their life. Sidman, Fiala, and D'Abundo (2011) defined exercise motivation as a psychological variable that is measured on a continuum of external reward or aversions and internal desires (Sidman et al., 2011). An article by Al-Kubaisy asked participants to rank 21 motivating factors on a scale, according to what influenced them to exercise the least to the most. This study involved a sample size of 505 adults who engaged in regular exercise. They found that the majority of people ranked "working out makes them more relaxed" and "working out gives them more energy to go about their daily chores" as their top two motivating reasons why they exercise. The majority of participants also cited that the two least motivating factors that influence them to exercise are; "recommended by the doctor" and "to have a positive effect on their sex life (Al-Kubasiy, 2015)."

According to a study conducted by, Whaley and Schrider, how people view themselves, from past experiences to current reality, will strongly influence their choice to be physically active. This particular study involved nineteen older adults ages 60-70. These adults were interviewed and asked questions about what motivated them to join a facility or to start an exercise regime. They concluded that; a person's sense of self-perception plays a major role in whether she/he will start an exercise program. Whaley and Schrider assert that research consistently shows that positive feedback (from exercise professionals), reinforcement (that exercise is worthy and beneficial), and social support (from significant others) will improve a person's self-perception to initiate an exercise program (Whaley & Schrider, 2005).

2.2 Exercise Adherence

Not only is it difficult to get people to want to participate in exercise initially, but it is also just as difficult to try to keep them interested and on track with their regular regime once they have started. Society today expects instant gratification. When individuals do not see instantaneous results or progress they tend to give up. Sometimes, even if progress has been made, individuals find their new routine so exhausting and time-consuming that they give up. Research shows that "over 50% of people will drop out of their attempted exercise routine within 6 to 12 months of initiation" (Freene, Waddintong, Cheswoth, Dvey & Gross, 2011).

Exercise adherence is an individual's ability to consistently exercise over long periods. Research has found that a person's adherence will vary depending on the individual's initial reasoning or

motivation to start exercising. A study conducted by Vallerland in 1997 found that although extrinsic goals may motivate people to initially start working out they will not have a lasting impact because participants are not finding any joy in what they are doing. If immediate results are not seen, or society's expectations have been met, people will be less inclined to continue exercising. In conclusion, he found that most people who join a gym and exercise consistently are more intrinsically motivated as opposed to extrinsically motivated (Vallerland, 1997).

A study conducted by Albright in 2005 examined the influence of goal-setting on exercise adherence. They utilized a goal-setting intervention to examine adherence and performance in 58 sedentary women. Results showed that the group that established specific goals (10,000 steps a day) reached and commonly even exceeded their goals. They had a significantly greater step count and greater adherence compared to the group that established a vague goal of 30 minutes of walking most days of the week. This study proved that people are more motivated to exercise and stick with their exercise regime when they are trying to reach self-set, specific goals. Therefore effective goal-setting has a positive effect on exercise adherence (Albright 2005). Goal setting is an effective skill implemented by athletes and coaches all over. When an individual sets their own goals they are more motivated and determined to achieve them.

There is also research available that supports that exercise adherence can be influenced by the gender of an individual. A study conducted by Ankita Dhone in 2017 looked at ten young females between the ages of 20-25. Participants were required to fill out an initial survey and then one every week following, throughout the study. The purpose of the initial survey was to discover the subject's most prominent motivational factors, determine if they could overcome obstacles, and provide them with the opportunity to state their goal or purpose of exercising. The weekly surveys required participants to report the number of days they exercised that week and how they would rate the intensity of those workouts. The researcher found that "non-adherent women were more likely to endorse body-related and health-related motives for exercising. Thus, women, who reported greater body-related motives for exercising, were less consistent in their exercise behavior throughout the four-week study, and they were less likely to meet their own goals" (Dhone & Gaikwad, 2017). In other words, females who were most motivated because of body-related issues, did not exercise as consistently and were not able to meet their unrealistic goals. Unfortunately, society today and especially young females are very influenced by the media and what they see on television. This could be an explanation for why women set such tough, unrealistic fitness goals. They want to look like the models that they see on television. When they don't reach these goals as quickly as they want to, they give up on exercising.

2.3 Self-determination Theory and Exercise

Over the past 15 years, a large number of research studies have applied Self-Determination Theory (SDT) in studies of health-related behavior change (Ryan & Deci, 2007). SDT is a motivation theory developed by Edward Deci and Rich-

ard Ryan that is concerned with figuring out what motivates people to behave in a particular way. This theory is centered on the fact that humans have three basic psychological needs. The first is a need for competence, which is the desire to master a skill and know the results of actions. The second need is to discuss the need for relatedness. This is a person's want to be accepted and desire to feel a part of something. The third is autonomy and this deals with a person's need to control the course of life (Tran, 2014). Deci and Ryan (2007) found that there are two types of motivation: autonomous and controlled. Autonomy is referred to in terms of intrinsic motivations, such as engaging in physical activity that is enjoyable or somehow nourishing to the individual's needs, and control is referred to in terms of extrinsic motivations, such as reward or eluding some type of punishment (Deci & Ryan, 2007).

Sheldon and Elliot (1999) discussed the benefits of striving for personal goals that were rooted in autonomous (intrinsic or identified) motivational regulations, in comparison to goal striving for internally or externally controlled reasons (introjected or external regulations, respectively) (Sheldon & Elliot, 1999). Many professionals have utilized this theory, which is applied to exercise through the paradigms of autonomy, competence, and relatedness (Mannetti, Kruglanski &Higgins, 2012). Studies have found that self-determination in motivation predicted higher levels of leisure-time exercise, and better quality of life (Gillson, Standage, & Skevington, 2006).

A study, conducted by Minyong (2016) involved evaluating the effectiveness of a 13-month group exercise program applying SDT-based motivational strategies on exercise adherence, physical fitness, and quality of life, and to explore factors affecting exercise adherence in South Korean older adults. More specifically, 20 adults ages 50 and older were used in this study. A few members of this group claimed that they were relatively sedentary while the majority reported that they exercise around 78 minutes a day. Participants had to take part in a 13-month exercise program 2 days a week, 60 minutes a day at Korea University. Participants' fitness and quality of life were assessed three times for purpose of this study; baseline, seven months, and at the end of 13 months. After each session, a group interview was conducted and surveys that asked about motivation and adherence were distributed at 7 and 13 months. Results of this study indicated that SDT-based interventions had a positive effect on exercise adherence. More than 85.2% of participants showed up for each session and only one participant dropped out of the study. According to a prior report, it is normal for half of the individuals who start an exercise program to drop out after 6 months. In the short-term, identified regulation (e.g., the effect of exercise) was the main contributor to exercise adherence, whereas long-term adherence to exercise was influenced by intrinsic motivation (e.g., the enjoyment or satisfaction from exercise) (Minyong, 2016).

The literature on this topic is complex but appropriate. Self-determination theory suggests that when individuals are more autonomous and intrinsically motivated they are more likely to establish goals and work towards them. Therefore, if this theory is correct, a lot of individuals who exercise and belong to a gym may be highly self-motivated

which is something the principal investigator is concerned with finding out.

2.4 Intrinsic Motivation and Exercise

Decades of research have shown that the quality of experience and performance can be very different when a person is more intrinsically motivated versus extrinsic motivated. Intrinsic motivation is when a person does something because they find it inherently interesting or enjoyable. When intrinsically motivated, the person experiences feelings of enjoyment, personal accomplishment, and excitement (Teixiera, Silva, Ryan & Markland, 2012). Intrinsic motivation can typically be measured through self-report or just seeing if participants are willing to do something even if there is no reward attached. Studies have suggested that the basis for maintaining intrinsic motivation is the person's feelings of competence, autonomy, and interest/enjoyment (Ryan & Deci, 2007). According to the Self-Determination Theory, "high intrinsic motivation comprises high competence, autonomy, relatedness, and low pressure and anxiety, and promotes vigorous participation in activities" (Ryan & Deci, 2000). Typically, in a fitness facility, intrinsic goals can be categorized as the health, fitness, and social relationships that one endures by exercising. Because intrinsic goals are self-motivated, they are associated with increased effort, performance, and persistence. In general, the research suggests that intrinsic motivation plays a significant role in getting people to exercise

Intrinsic motivation is a key factor concerning exercise adherence as well. Many studies support the theory that "spontaneous enjoyment of an activity leads to increased persistence and reduced stress and positive psychological feelings" (Ryan & Sheldon, 1997). Research reveals that individuals who are more intrinsically motivated are more likely to continue being physically active for long periods.

Although there is not a lot of research available supporting the fact that males are more intrinsically motivated than females, Gallagher and colleagues did find evidence suggesting this. Their study was conducted in 2012. It took place over three years and involved 710 participants in and around Berlin, Germany. They had participants report their life goals and their motivation source influencing them to achieve those goals. Next participants had to record their physical activity over 25 days. Results revealed that intrinsic motivation seemed to impact the males that participated in this study more than the females (Gallagher, Yancy, Swartout, Denissen, Kühnel & Voils, 2012).

These studies reveal how strong of an impact intrinsic motivation can have on an individual especially in regards to exercise adherence. It is clear that when individuals are intrinsically motivated they are more determined to do what it takes to achieve their goals.

2.5 Intrinsic Motivation and Exercise

Extrinsic motivation is when a person does something because it leads to a separable outcome. A person might be extrinsically motivated to do something when they are seeking approval from others or they are interested in reaping the benefits or rewards that will come from participating. Recent studies have suggested that extrin-

sically motivated behaviors are not, "inherently interesting and the primary reason people are likely to be willing to do the behaviors is that they are valued by significant others to whom they feel (or would like to feel) connected, whether that be a family, a peer group, or a society" (Ryan & Deci, 2007). Research on extrinsic motivation strongly suggests that people exercise to meet society's standards in regards to looks and appearance. Extrinsic exercise goals usually refer to improving physical appearance and losing weight and are created because people feel insecure or inadequate about themselves.

Gillson has suggested that "some of the precursors to the extrinsic goals of weight management and appearance begin to emerge at or around puberty, largely due to the impact of the biological and associated social changes occurring at this time and the increasing importance of physical appearance to peer acceptance and social status (Gillson, Standage, & Skevington 2006). He found that young adults are more likely to be extrinsically motivated to exercise because of the undue pressure of society to have a healthy physique.

Brawley and Vallerland support the majority of research out there that suggests that extrinsic motivation is not a substantial source of motivation. They suggested that individuals tend to initially participate in fitness programs for external reasons (to lose weight/improve appearance), but this kind of motivation typically leads to poor exercise adherence (Barwley & Vallerland, 1997). The researchers concluded that although extrinsic goals may motivate people to initially start working out they will not have a lasting impact because participants are not finding any joy in what they are doing. If immediate results are not seen, or society's expectations have been met, people will be less inclined to continue exercising. The research suggests that the majority of consistent exercisers are more likely intrinsically motivated as opposed to extrinsically motivated.

2.6 Introjected and Identified Motivation

The self-determination theory identifies introjected motivation as "motivation that focuses on the maintenance or enhancement of self-worth (Assor, Kaplan, & Roth, 2002)." In simpler terms, this is when a person is pressured to look or behave a certain way because society deems it as "the norm" or "attractive". When a person is described as being introjected motivated they are letting society establish their values and goals because they want to be accepted and maintain high levels of self-worth. Researchers have also discovered something commonly known as introjected avoidance, meaning you "try to avoid feelings of low self-worth, shame, or guilt that may arise as a result of the failure to live up to the introjected standard" (Assor, Vanteenkiste, & Kaplan, 2009). Because introjected motivation is typically associated with societal pressure and coercion, it is not viewed as a strong, healthy motivator.

To be able to encourage more people to participate in regular exercise, it is important to have a solid grasp on why people choose to participate or not to participate in physical activity. Some people exercise to reap the numerous health benefits, while others exercise to keep up with society's definition of "attractive," and "beautiful."

While society can be seen as a strong motivator for some, it can also be viewed as a deterrence for others. Social physique anxiety is a very real concept, that "deters individuals from physical activity because they are concerned with people negatively assessing their bodies." This form of anxiety is very common among college-aged students. Researcher, Hui-Wen Chu, wanted to explore the relationship between social physique anxiety and the obligation to exercise in college students. To do this he recruited 377 college students and had them fill out three different questionnaires. In this specific study, women experienced higher levels of social physique anxiety than did men. The researchers did not find it surprising that a higher obligation to exercise is manifested in a self-reported higher activity level. men and women had the same level of obligation to exercise (Chu, 2008).

Identified regulation, on the other hand, is when people behave a certain way because it aligns with their values and beliefs. It is often associated with the term self-actualization and is viewed as being much more autonomous in terms of SDT. Identified motivation is often looked at as being a stronger motivator that enables people to pursue and reach their goals. A study conducted by Avi Assor which involved 1,222 adolescents tested the theory that identified regulation as a more positive motivator. Results revealed that "specifically, compared with introjected approach and introjected avoidance motivations, identified motivation had much stronger unique associations with mastery goals, well-being, and engagement indicators and was the only motivation that was positively related to the performance measures" (Assor, Vanteenkiste & Kaplan, 2009).

2.7 Amotivation

Vallerland defines amotivation as a "lack of intentionality and thus the relative absence of motivation" (Vallerand, 1999). People that are described as being amotivated do not associate any benefits with exercising, or they feel as if there is no correlation between their behavior and outcomes. This ultimately leads to a struggle to consistently participate or participate at all in exercise (Vlachopoulos & Gigoudi, 2008). Amotivation has been linked to athletes dropping out of a sport and low involvement or absence in physical education classes. The BREQ did not always include amotivation to assess exercise due to their high level of skewness, but Markland and Toblin believed it was necessary and an excellent fit for the model. Amotivation may occur for several reasons. Pelletier coined the term "capacity beliefs" in 1999, which meant that individuals believed they lacked "the physical and psychological resources required to cope with the demands of regular exercise participation" (Pelletier, Dion, Tuson & Green-Demers, 1999). Research suggests that another reason people could be defined as amotivated is that they do not believe the benefits outweigh the cost of exercising. In 2003 researchers, Cropley and colleagues found that nonexercisers "provided more "con" reasons (costs) related to exercise than did maintainers (regular exercisers), who provided more "pro"s (benefits), and other studies have supported the relationship between outcome expectations and older adults' physical activity behavior" (Cropley, Ayers & Nokes, 2003).

2.8 Gender and Exercise Motivation

Typically, men and women are not driven by the same things and they tend to react to situations and prioritize things differently. There have been numerous studies conducted on gender differences and motivation in the workplace, in school, and in life. These facts lead us to assume that men and women in this study will report different levels of motivation. When researching gender and exercise motivation, several conflicting results appeared. A study conducted by Al-Kubaisy (2015) revealed that although men and women did rank motivational factors differently, the difference was very slight or insignificant. They found that the most significant difference was that men ranked; "having more energy for the day" and "to have a positive effect on their sex life", higher than females did. While females ranked improving their appearance and having more energy for daily chores than males did (Kubaisy, Mohamed, Ismail Abdullah & Mokhtar, 2015).

2.9 Age and Exercise Motivation

Another key factor that has the potential to impact exercise motivation is age. Although exercise is vital to engage in at any age, the reasons people exercise tend to change throughout one's life. As individuals grow older, they experience changes in energy levels, metabolism, and overall functions of the body. These changes force people to prioritize different things. The researchers of a study conducted in 2011, were curious to see just how large of an impact age has when people cite motivational factors that influence them to exercise. They conducted a cross-sectional study that entailed 2,199 participants from 156 different sections of physical activity classes to fill out the Exercise Motivation Inventory. The researchers created two different age groups which were, participants younger than 20 and participants 20 years and older. They found significant differences when analyzing the 14 subscales and the age of participants. Between the 2 age categories, significant differences were found in affiliation ($p=.036$), health pressure ($p=.002$), and ill-health avoidance ($p=.020$). Participants younger than 20 years old were more likely to be motivated by health pressure and ill-health avoidance, whereas those 20 years old and greater were more likely to be motivated by affiliation (Egli, Bland, Melton & Czech, 2011).

Another study conducted by Molanorouzi, found that young and middle-aged adults reported scoring very differently in motivational subscale categories. The central measure tendency indicated that young adults reported: "higher affiliation, mastery, and enjoyment associated with participation in physical activity than middle-aged adults, whereas middle-aged adults considered psychological condition and others' expectations more important motives for participating in physical activity than young adults" (Molanorouzi, Khoo, & Morris, 2015).

In a study conducted by Al-Kubaisy, results revealed that younger adults were more likely to engage in physical activity than older adults. The explanations for such results could be that, older adults may have; a perception of great effort needed for exercise, perception of poor health, overweight or obesity, or being disabled due to physical, emotional, and psychological

problems. In addition, lack of social support, lack of transportation to facilities or inaccessibility of facilities, fear of injury and the difficulties of managing physical injury faced by elderly people may act as barriers that keep them far from being physically exercised (Al-Kubaisy, 2015). In conclusion, "physical activity seems to decline with age during adolescence and by the time US citizens reach adulthood, more than two-thirds are sedentary or inactive below the recommended level for health benefits" (CDC, 2011).

Research has also revealed that a person's willingness to stick to or adhere to their exercise regime varies depending on the age of the person. Although the research supporting this is scarce, there are numerous reasons supporting why this statement could be true. A person may start exercising more consistently after they reach retirement age (60-65) because they have more time to do so. They also may believe that engaging in regular exercise could potentially increase their life expectancy. Also, researchers have found that an important indicator of future behavior is past behavior. Therefore, "early exercise experiences and recent involvement in physical activity have often been shown to predict adherence to a current exercise program" (Rhodes, Martin, Taunton, Donnelley & Elliot, 1999).

Unfortunately, decreasing overall health is often associated with growing older. As a person's health starts to deteriorate, they find it more and more difficult to continue a rigorous exercise regime. A study conducted by Emery in 1981 involved analyzing a sample size of 101 men and women who fell between the ages of 60-85 years. These participants were required to participate in a 10-12 week exercise program. Researchers recorded their observations. Emery concluded that "certain physical health measures such as greater cardiorespiratory endurance and faster psychomotor speed were the most significant predictors of adherence using regression analysis" (Emery, Hauck, & Blumenthal, 1981). Another study conducted by Williams and Lord limited their study to just women. Their sample size was 102 women between the ages of 60-65. They were required to be monitored and observed over a 12-month exercise program. Results revealed that body limitations, reduced strength, and slow reaction time resulted in these women coming in less and less. Research indicated that elderly people will cite things such as illness, feeling weak, and overall poor physical health as reasons why they do not exercise as often as they would like.

Depending on the stage of life a person is in their priorities and perspectives begin to change. Therefore it is safe to assume that college students and elderly adults are most likely motivated by different factors in regards to exercising. The results of the literature on this subject seem to agree with the hypothesis, that age does play a big role in determining motivational factors. One of the most obvious differences fell under the category of personal goal setting. The results from a study conducted by Campbell revealed that younger adults ranked "having fun as one of their most influential factors to working out while older adults did not rank this high on their priority scale at all." In fact, upon further research, they discovered that older adults did not typically find a correlation between exercise and fun at all. This study also revealed that 85% of younger adults

ranked maintaining or improving their health as one of their most motivational factors compared to 72% of older adults. The most similar results between the age groups fell under personal goals. Both older and younger adults ranked; "feeling in good shape" as their most important personal goal (Campbell, MacAuley, & McCrum, 2001).

2.10 Grit

A woman by the name of Angela Duckworth has dedicated her life's work to defining and expanding on the concept of grit. Grit is a psychological trait used to measure a person's passion for a particular long-term goal or end state. It entails "working strenuously toward challenges and maintaining effort and interest over years despite failures, adversity, and plateaus in progress" (Duckworth, 2007). The impact of grit has been studied by numerous different researchers. It has been cited as the main reason that people can overcome difficulties and consistently pursue their goals even in the face of adversity. For example, Robertson was interested to see if grit could predict whether teachers in low-income areas would stick with their job. Grit was measured or determined based on their answers to a seven-question survey. Results revealed that "grittier teachers outperformed their less gritty colleagues and were less likely to leave their classrooms midyear" (Robertson & Duckworth, 2014).

Another study by Duckworth in 2009, involved looking to see if there was any correlation between a person's grit level and the number of hours they put into practicing or preparing for a competition. Although this study does not involve exercise, it involves the concept of adherence in terms of the number of hours a person spends practicing. To do this Duckworth examined participants in the National Spelling Bee and measured their level of "grit" verse their level of "openness to experience." Duckworth wanted to discover if grit could determine a competitor's ability to advance to the next round of the completion. The results of this study revealed that participants that performed well in the National Spelling Bee usually ranked higher in grit than those who did not perform as well. Specifically, the grittier spellers performed better. This could be attributed to the fact that grittier spellers spent more hours practicing than their less gritty competitors. Grit "was a significant predictor, indicating that finalists with grit scores a standard deviation above the mean for same-aged finalists were 41% more likely to advance to further rounds to (Duckworth, 2009).

2.11 Grit and Exercise

Duckworth investigated the relationship between a person's level of grit and their ability to complete a strenuous physical task. More specifically, in July of 2004, she examined a sample size of 1,218 freshman cadets who entered the United States Military Academy, at West Point. She and her fellow researchers were looking to see what could better predict which candidates would complete the demanding summer training program, "grit" or "self-control". A questionnaire was distributed to the cadets on their 2nd and 3rd days after they arrived at West Point. This questionnaire, known as the Brief Self-Control Scale, consisted of 13 questions and was meant to measure and assess their levels of grit and self-control. Out of

the total sample, 94.2% of cadets completed the summer training (1,152), which means the remaining 5.8% dropped out (71). Results revealed that a person's grit level predicted completion of the summer training program better than any other predictor. Cadets who reported higher than average in terms of grit level were more than 60% more likely to complete summer training (Duckworth, 2007).

With exercise adherence being a major issue in today's society, many researchers have looked into why certain people can consistently stick with their difficult exercise programs while others do not. They wondered what traits an adherent exerciser possesses. Duckworth argues that people with higher levels of "grit" are more likely to stick to engaging in regular exercise. More researchers have been interested in studying the relationship between grit and exercise. Justice Reed from Chicago University conducted a study that involved 1,171 participants. These participants were required to fill out an online survey that revealed demographic information, exercise information, and trait differences. Reed found that; "Grit, conscientiousness, and industriousness were positively correlated, but regression analysis showed that grit provided the predictive capability for exercise score over and above industriousness and conscientiousness. Further analyses showed a significant positive linear trend for grit and exercise scores. Additionally, although exercisers and non-exercisers were statistically similar on industriousness, exercisers, on average, reported significantly higher grit scores than nonexercisers" (Reed, 2014).

2.12 Grit and Gender

In 2009 Duckworth conducted six different studies involving grit and in all six she found that grit scores did not differ between genders. The research available on if gender impacts grit level has produced some mixed results. Some researchers' results found significant differences in gender and grit scores while others did not. For example, in 2012 Rojas and colleagues conducted a study involving 2,426 (female= 49.9, male= 50.1) students in grades 4 to 8. Grit was assessed using an adaptation of the original Grit scale and compared to scores in reading and math. Rojas found that the girls reported higher grit scores than the males in this study at the $p < .001$ level (Rojas, Reser, Usher, & Toland, 2012). Jager and colleagues found similar results when conducting their five-year study of engineering students. These researchers were interested in investigating the grit levels in these students as they continue through the program to see if they increase. Jager found significant differences between genders, noting that women reported higher levels of grit. However, in 2011 Batres conducted a study examining the relationship between grit, happiness, student's GPA, and overall attendance. Her results indicated no difference in gender and grit levels (Batres, 2011).

2.13 Grit vs Age and Education Level

Duckworth also wanted to determine the relationship between grit and a person's education level. To do this she conducted a study involving 1,505 adults ages 25 and older. Participants were required to report their age, gender, and education level. Results revealed that education does seem

to play a role in relation to grit. More educated adults scored higher in grit than less educated adults. Post hoc comparisons revealed that when age is controlled for, post-college graduates were higher in grit than most other groups. They also found that when education level is controlled for, grit increased monotonically with age; however, 25- to 34-year-olds did not differ significantly from 35- to 44-year-olds, and 45- to 54-year-olds did not differ significantly from 55- to 64-year-olds (Duckworth, 2011).

3.Methods

3.1 Participants

The subjects for this research study included all willing, current members of the James G. Mill Center for Health and Fitness. The center is a health and wellness facility open to Indiana University of Pennsylvania's retired and current faculty/staff members, students, and the general community. This fitness center is located in Zink hall and consists of updated treadmills, ellipticals, machines, a full set of free weights, and an aerobics room. Every time an individual buys a membership here, they are required to fill out papers so they can be entered into the membership database. According to the most recent membership roster, which is updated on a yearly basis, the total number of current fitness center members is around 200 people. Out of these 200 members, it is estimated that around 90 people come in regularly throughout the week. The researchers received 80 surveys back from participants, 78 of which were analyzed and used in this study. This subject pool is both convenient and non-random because the researcher was specifically seeking out the active members of the fitness center. Subjects and to be 18 years or older to participate. The only characteristics that would have caused exclusion are if they did not want to participate or they did not fill out the survey completely.

3.2 Recruitment Strategies & Procedures

The recruitment strategies involved having all employees of the James G. Mill Center for Health and Fitness distribute surveys at the front desk of the fitness center. Employees asked members to complete the survey before their workout. The survey took no longer than 15 minutes to complete. If they choose to participate they had to complete the survey and place it in the assigned drop box. There were two drop boxes available to participants. One was located outside the primary researcher's office and the other was located in the fitness center. The surveys were kept in a secure location that only the principal investigator and committee members had access to. Although this survey was not anonymous only aggregate data was published. By completing and returning the survey members provided informed consent to be research subjects in the study. Recruitment of participants and garnering of data took place over five weeks.

3.3 Instrumentation

The first part of the survey contained questions regarding demographics. Participants were required to report their name, age, gender, height, weight, education level, membership type, and the number of times they exercise per week. I separated participants into two age groups (l= less than thirty; 2= thirty and older).

For purpose of this particular study, the survey packet used was comprised of two separate surveys; the Behavioral Regulations Questionnaire (BREQ-3) and the Short 8-Item Grit Scale.

BREQ-3

The BREQ-3 is "the most commonly used multidimensional measurement tool in psychological research, based on the continuum of behavioral regulation in exercise," (Markland & Tobin, 2004). This survey was initially used to calculate each participant's underlying motivation based on Deci & Ryan's theory of self-determination. It groups behavioral regulation into one of these six categories; amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation. The internal consistency of each scale on the BREQ-3 were as follows; Amotivation, a = .847, External Regulation, a =.749, Introjected Regulation, a = .793, Identified Regulation, a = .780,Integrated Regulation, unreported,and Intrinsic Regulation, a =.894 (D'Abundo et al., 2014). Each of these subscales is given its separate weighting or score, and then the researcher must calculate the unidimensional index of the degree of self-determination, known as RAI (Ryan & Connell, 1989). The RAI is calculated by weighting each subscale and summing the weighted scores: (amotivation multiplied by -3) + (external regulation multiplied by -2) + (introjected regulation multiplied by -1) + (identified regulation multiplied by +1) + (integrated regulation by +2 (intrinsic regulation multiplied by 3). Higher positive scores for the RAI indicate more autonomous motivation whereas lower negative scores indicate less autonomous motivation (Exercise Motivation Measurement).

Short Grit Scale

In addition to the BREQ-3, the researchers also implemented an already validated, 8-item grit scale to measure the passion and perseverance of participants. This short grit scale was successfully modified from the previous 12-item Grit Scale. The maximum score on this scale is 5 (extremely gritty), and the lowest scale on this scale is 1 (not at all gritty). To score this survey, the researchers added up all of the points and divided them by 8 for each participant (Duckworth & Quinn, 2009). This instrument is both valid and reliable: internal consistency (a = .73-.79) (Duckworth & Quinn, 2009).

3.4 Statistical Analysis

The BREQ-3 and Short 8-item grit scale were used to survey the participants to investigate the relationship between motivation and grit levels in regards to members of the fitness center.

Descriptive statistics were used to compare demographic factors such as gender, age, education level, and BMI. To investigate the relationship between motivation levels and members of the James G. Mill, responses to the BREQ-3 were examined. The data were categorized according to gender, age, and education level of participants, and scores from the BREQ-3 were examined categorically and continuously. Pearson Correlation Coefficient was used to determine the relationship between motivational subscales and the number of days exercised in the last week. Sev-

eral independent *t* tests were run to assess the differences between the gender/age of participants and their overall RAI scores. An ANOVA was run to compare education level and RAI scores. To explore the impact grit has on influencing individuals to exercise, responses from the Short Grit Scale were examined continuously. Independent samples *t*-tests were run to assess the differences between the gender/age of participants and their total grit score. An ANOVA was run to compare education level and total grit score.

4.Results

4.1 Survey Analyzed

The study questionnaire, comprised of the multidimensional scoring scale known as the BREQ-3 and the Short Grit Scale questionnaire, was distributed to members of the JGM. Everyone that entered the facility was asked to complete the survey. A total of 80 surveys were returned. Among these 80 distributed surveys, 2.5% (n =2) were not usable because they had missing values. Statistics were run based on the 78 surveys that were completely filled out. The total percentage of useable surveys for this study was 97.5%.

4.2 Demographics

The age of participants who took place in this study ranged from 19-80. For purposes of this study, participants were categorized into two age groups; participants less than thirty vs participants thirty and older. Of the 78 participants in this study, 53.8% (n=42) were male while 46.2% (n=36) were female. The majority of participants in this study reported exercising 4 times a week. Other characteristics are reported in Table 1.

Table 1 *Demographic Characteristics of Participants*

		Percentage
Gender	Male	53.8%
	Female	46.2%
Education level	High school	10.3%
	College	51.3%
	Higher than college	38.5%
Membership package	Student	39.7%
	Faculty/Staff	33.3%
	General Community	27.0%

4.3 BREQ-3 Results

The mean RAI score was M = 59.03 (Table 2). Based on the RAI calculations, the majority of participants reported being intrinsically motivated (M = 37.96), the next highest reported motivation was Integrated Regulation (M = 25.18), followed by Identified Regulation (M = 14.0). On average, participants reported Amotivation (M = -1.7692), External Regulation (M = -6.0256) and Introjected Regulation (M = -10.32) as the motivation source they pull from the least.

Pearson Correlation Coefficients were calculated to determine the relationships between the number of days participants exercised in the last week and the BREQ-3 motivation subscales. Results revealed weak correlations for Amotivation, Introjected Regulation, and Intrinsic Regulation that did not significantly correlate with the number of days exercised in the last week. However, the correlation tests revealed that External Regulation (r = .307) Identified Regulation (r = .343), and Integrated Regulation (r = 3.08) were significantly and low to moderately correlated with Exercise at the p = .01 level. A correlation was also calculated to show the relationship between RAI score and participants' self-reported number of days exercised in the last week. A medium positive correlation was found (r = .339, p < .01). From this information it is inferred that participants who reported more days exercised in the last week tend to have higher RAI scores (Table 3).

Table 2 *Results of BREQ-3*

BREQ-3 Subscale	Mean	Std. Deviation
Amotivation	-1.77	5.35
External Regulation	-6.03	6.78
Introjected Regulation	-10.32	4.01
Identified Regulation	14.00	2.27
Integrated Regulation	25.18	6.63
Intrinsic Regulation	37.96	8.63
RAI	59.03	20.46

4.4 Gender and RAI

To examine differences between the gender of participants and their overall RAI scores, an independent samples *t*-test was calculated comparing the participant gender and overall RAI scores. No significant difference was found (t (76) = -0.133, p > .05). The mean of the males (M = 58.7381) was not significantly different from the mean of females (M = 59.3611). The bar graph serves as a visual representation that the RAI score

Table 3 *Motivation Subscales and Number of Days Exercised*

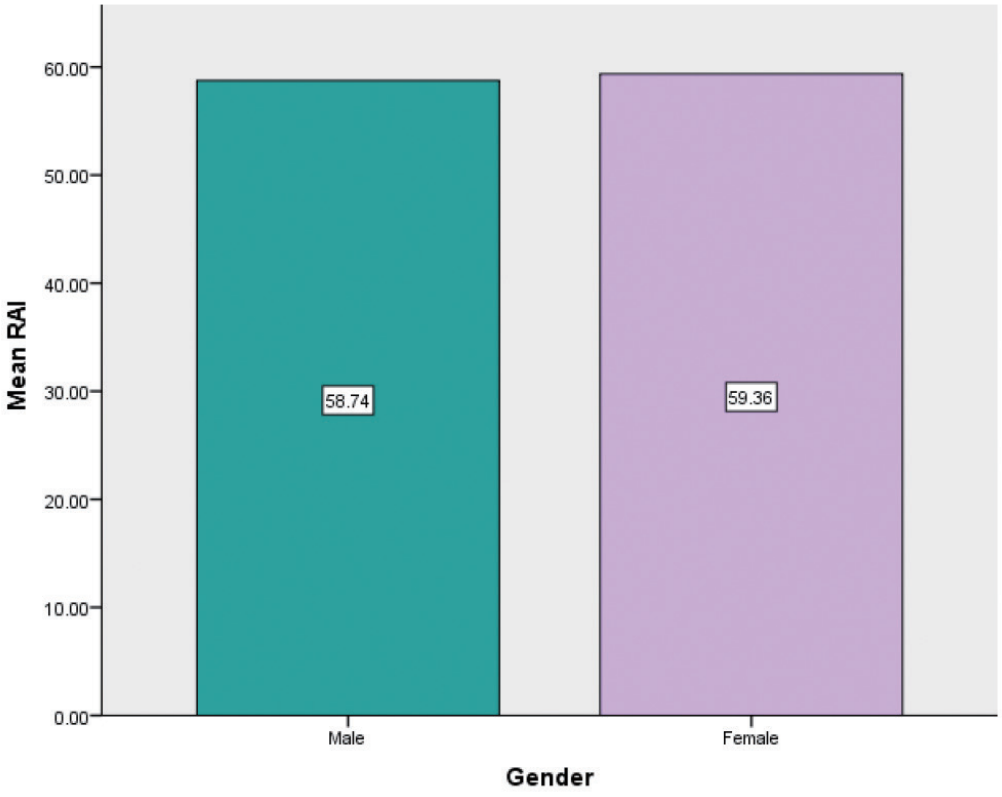
		Exercise	External Regulation	Introjected Regulation	Integrated Regulation	RAI
External Regulation	Pearson Correlation	.307*				
	Significance	.006				
	N	78				
Identified Regulation	Pearson Correlation	.308**	.244*	.735**		
	Significance	.006	.031	.000		
	N	78	78	78		
Integrated Regulation	Pearson Correlation	.308**	.244*	.735**		
	Significance	.006	.031	.000		
	N	78	78	78	78	
RAI	Pearson Correlation	.339**	.708**	.687**	.698**	
	Significance	.002	.000	.000	.000	
	N	78	78	78	78	78

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

** Correlation is significant at the 0.01 level (2-tailed)

was not even one full point different be- tween males and females (See Figure 1). Independent samples *t*-tests were calculated comparing gender and scores for each motivational subscale. The researchers were particularly interested in comparing genders and external regulation. No significant differences were found (t (76) = .236 $p > .05$). The mean of females (M = -6.2222, *sd* = 7.661) was not statistically different from the mean of males (M = -5.8571, *sd* = 6.0145).

Figure 1. *Gender and RAI*



4.5 Age and RAI

Independent samples *t*-tests were used to examine the relationship between the age of participants and their overall RAI Score. No significant difference was found (t (5) = .913, $p > .05$). The mean RAI score of participants less than 30 years of age (M = 61.3714) was not significantly different from the mean score of participants 30 years of age and older (M = 57.1163). Several independent samples *t*-tests were run to examine the relationship between age groups and each BREQ-3 motivation subscale. No significant difference was found (t (76) = .902, $p < .05$). The mean Introjected Regulation score of participants less than 30 years of age (M = - 5.2571) was not significantly different from the mean score of participants 30 years and older (M = -6.6512).

4.6 Education Level and RAI

A one-way ANOVA was computed comparing the education level of participants and their overall RAI score. No significant difference was found (F (2,75) = .998, $p > .05$). Participants who received only a high school education (M = 67.75, *sd* = 16.21) had the highest RAI score when compared than participants who received a college degree (M = 59.33, *sd* = 17.14) and participants who furthered their education past college (M = 56.30, *sd* = 20.45) when comparing their RAI scores.

4.7 Investigation of Grit

Grit and Education Level

The education level of participants and their reported total grit levels were compared using a

one-way ANOVA. No significant difference were found (F (2,75) = .063, $p > .05$). Participants who furthered their education past college had the highest mean score of 3.966 (*sd* = .519). Participants who received a college degree had a mean score of 3.962 (*sd* = .599). Participants who received only a high school education had the lowest mean score of 3.89 (*sd* = .488).

Grit and Age

An independent samples *t*-test was calculated to compare the mean score of participants' ages and their total grit score. No significant difference was found (t (76) = -.199, $p > .05$). The mean total grit score of participants less than 30 years of age (M = 3.9429) was not significantly different from the mean of participants 30 years and older (M = 3.9680).

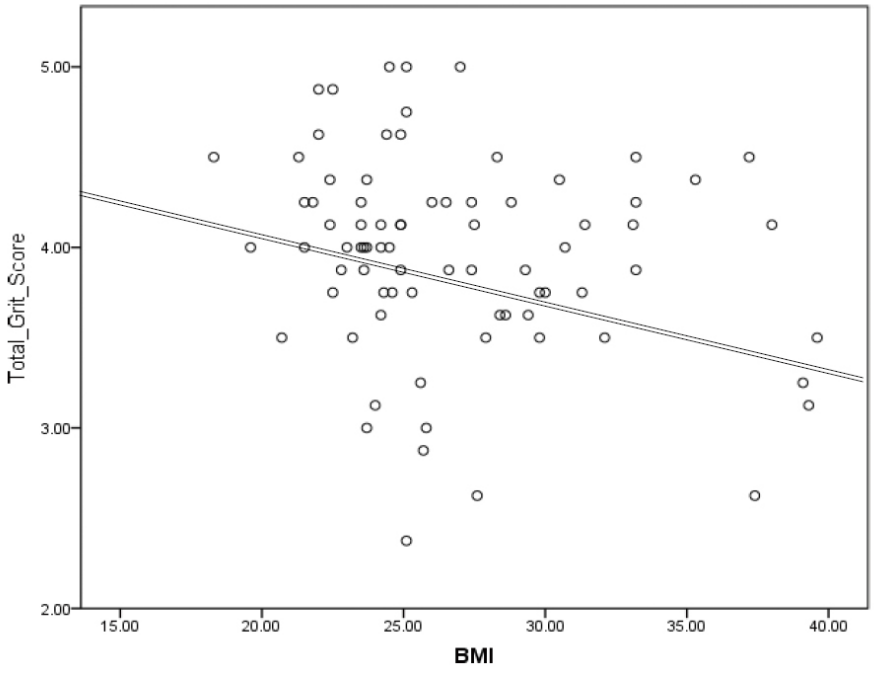
Grit and Gender

An independent-samples *t*-test was calculated comparing the gender of participants and their total grit score. No significant difference was found (t (76) = 0.027, p > .05). The mean of the male participants (M = 3.9583) was not significantly different from the mean of the female participants (M = 3.549).

Grit and BMI

An exploratory analysis was conducted to determine the relationship between participants' BMI scores and their total grit scores. A Pearson Correlation Coefficient test revealed a significant correlation was found (r = -.228, $p < .001$) indicating a small, negative relationship between the two. This suggests an inverse relationship, meaning participants with higher BMIs tend to have lower total grit scores. (See Figure 2).

Figure 2. *BMI vs Grit Score*



Grit and RAI

A second exploratory analysis involved conducting another Pearson Correlation Coefficient to examine the relationship between total grit score and RAI. A significant correlation was found ($r = .441$, $p < .01$), indicating a medium positive between these two variables. Participants with higher RAI scores tend to have higher total grit scores (Table 4).

Table 4 *RAI and Total Grit Score*

		RAI Grit	Total Score
RAI	Pearson Correlation	1	.441*
	Significance		.000
	N	78	78
Total Grit Score	Pearson Correlation	.441*	1
	Significance		
	N		

* Correlation is significant at the 0.01 level (2-tailed)

5.Summary of the Study

While it has been well-established that participating in regular exercise has many health benefits, including stress relief and decreasing the risk of cancer and heart disease, according to the CDC, only 20.6% of adults are exercising the recommended 150 minutes per week. Having all the information on the numerous benefits of regular exercise readily available to the general public does not serve as sufficient enough motivation to increase the number of people who exercise. Motivation is a critical component of sustained participation in exercise. Increasing research has been done to explore the reasons why individuals are motivated to exercise. More recently, a non-cognitive trait, grit, defined as the perseverance and passion for long-term goals, has also been explored for its role in exercise. A woman by the name of Angela Duck- worth has focused her life's work on defining and expanding the concept of "grit." Grit is a psychological trait used to measure a person's passion for a particular long-term goal or end state. Grit entails working strenuously toward challenges, and maintain effort and interest over years despite failures, adversity, and plateaus in progress (Duckworth, 2007).

Past research suggests that motivation levels will vary depending on age, gender, and education levels. Literature also reveals that an individual's grit can vary depending on several different factors. Findings from this study reveal pertinent information about the motivation and grit levels of members of the JGM.

Prior to conducting this study, two research questions and four hypotheses were formed based on prior research and literature available on this topic. These research questions and hypotheses involved the following topics; deciphering what motivational factors influence people to exercise at the JGM if motivation varies depending on age gender and education level and if grit levels are affected by age, gender, and education level. A series of independent sample *t*-tests, one-way ANOVAs, and Pearson correlations revealed that 3 of the 4 were null hypotheses. The only one that was correct was that the majority of participants were intrinsically motivated.

Exploratory analyses were conducted throughout this study revealing certain significant relationships. Pearson correlation coefficient tests revealed a small, inverse relationship indicating that participants with higher BMIs tend to have lower total grit scores. A medium positive correlation was found when comparing participants' total RAI and grit scores. Another medium positive correlation was found when comparing the number of days exercised in the last week and total RAI score, indicating that participants who exercised more consistently in the last week tended to have higher RAI scores.

6.Conclusion

A total of 78 usable surveys were collected through the facility and analyzed for this study. For this sample, the results from the BREQ-3 revealed that the two highest reported be- behavioral regulations were Intrinsic Regulation (M = 37.96) and Integrated Regulation (M = 25.18). Also, significant relationships were found between the number of days exercised in the last week, external regulation, identified regulation, integrated regulation, and the overall RAI score. The primary researchers hypothesized that females and younger adults would report higher levels of external regulation. However, our results rejected this hypothesis. There were no significant differences found between external regulation and gender/age. There were also no significant differences found between RAI and gender, education level, and age of participants.

The 8-Item Grit Scale revealed that there was a significant correlation between RAI score and total grit score, which suggests that participants with higher RAI scores have higher grit scores. It was hypothesized that females would report higher grit levels than males based on the research, however, an independent samples *t*-test rejected that hypothesis. The results concluded that there was no significant difference between age, gender, and education levels in regards to total grit score. However, there was a small, negative linear relationship between BMI score and total grit score. The correlation suggests an inverse relationship, meaning participants with higher BMIs tend to have lower total grit scores. The results from this study population did not find any significant results regarding gender, age, and education level when compared to motivation and grit.

7.Direction for Future Research

This research from this study may be pertinent for fitness center managers everywhere. Results from this research will contribute to a greater understanding of the role that motivation and grit play in influencing individuals to exercise.

Results can then be used to provide recommendations to facility managers to help members increase motivation to exercise, contributing to increasing member satisfaction with the facility. The ability to meet the demands of customer satisfaction is essential for facility managers in the growing competitive fitness industry and this information can help managers do just that. (Theodorakis, Alexandris, Rodriguez & Sarmento, 2004). The information garnered from this study can be used to increase exercise among individuals. Having a good grasp on what motivates individuals to exercise will allow a facility manager to implement the proper equipment, classes, and services to attract more clientele. Understanding the motives behind why people exercise will also allow a fitness facility manager to foster an environment where customers are reaching their goals, which ultimately leads to higher customer satisfaction.

The results of this study cannot be generalized to all individuals who exercise at a fitness facility, as it only included members from the JGM. Again, this fitness center is open to students, faculty and staff, and general community members in the area. We were only able to analyze 78 surveys, which is not a large number. We implore future researchers to study a larger, more diverse population.

It is recommended that future researchers conduct a more observational, longitudinal study with qualitative elements. They could observe a particular group for a longer period of time and ask them to explain their exercise goals and why they are motivated to achieve them. Motivation and grit levels could be assessed using similar surveys. When the observational period, the relationship between people who accomplished their exercise goals and their motivation and grit levels could be examined.

Furthermore, we believe the relationship between motivation, grit, and exercise should be investigated further. Prior research shows motivation plays a strong role in getting people to start exercising and continue exercising over long periods. Grit is a relatively new topic with a lot of room for more research. Exercise is so vital and instrumental in living a healthy, pro- longed life so figuring out how to increase the number of people who exercise is very important.

REFERENCES

Albright, C, Thompson, D. L., & Hultquist, C. N. (2005). Comparison of walking recommendations in previously inactive women. *Medicine and Science in Sports and Exercise, 37*(4), 676-68.

Al-Kubaisy, W., Mohamad, M., Ismail, Z., Abdullah, N. N., & Mokhtar, M. M. (2015). Motivation to physical exercise: Is it diverse with different sociodemographic characteristics particularly the gender? *European Scientific Journal,* 193-203.

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviors predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72,* 261–278

Assor, A., Vansteenkiste, M., & Kaplan, A. (2009). Identified versus introjected approach and introjected avoidance motivations in school and in sports: The limited benefits of self-worth strivings. *Journal of Educational Psychology, 101*(2), 482-497. doi:10.1037/a0014236

Batres, I. (2011). *The relationship of grit, subjective happiness and meaning in life on alternative education students' GPA and attendance* (Order No. 3480016). Available from ProQuest Central; ProQuest Dissertations & Theses Full Text. (897661487).

Buckworth, J., Lee, E., Regan, G., Schneider, K., & DiClemente, C. (2007). Decomposing intrinsic and extrinsic motivation for exercise: application to stages of motivational readiness. *Psychology of Sport and Exercise, 8,* 441-461.

Bureau of Labor Statistics. *"Sports and Exercise." U.S. Department of Labor Statistics.* Last modified May 15, 2008. http://www.bls.gov/spotlight/2008/sports/

Campbell, P. G., MacAuley, D., & McCrum, E. (2001). Age differences in the motivating factors for exercise. *Journal of Sport & Exercise Psychology, 23*(3), 191-199.

Centers for Disease Control and Prevention. (2011). *The CDC guide to strategies to increase physical activity in the community.* Retrieved from; http://ww.cdc.gov/obesity/downloads/PA_2011_WEB.pdf

CDC: 80 percent of American adults don't get recommended exercise. (2013, May 3). Retrieved from; http://www.cbsnews.com/news/cdc-80-percent-of-american-adults-dont- get-recommended-exercise

Chu, H., Bushman, B. A., & Woodard, R. J. (2008). Social physique anxiety, obligation to exercise, and exercise choices among college students. *Journal of American College Health: J of ACH, 57*(1), 7-14. doi:10.3200/JACH.57.1.7-14

Cropley, M., Ayers, S., & Nokes, L. (2003). People don't exercise because they can't think of reasons to exercise: An examination of causal reasoning within the transtheoretical model. *Psychology Health and Medicine, 8*, 409–414

Deci, E., & Ryan, R. (2008). Self-determination theory: A macrotheory of human moti-

vation, development, and health. *Canadian Psychology. 49*(3), 182-185.

D'Abundo, M. L., Sidman, C. L., Milroy, J., Orsini, M. & Fiala, K. (2014). Construct validity of college students' responses to the Behavioral Regulation in Exercise Questionnaire (BREQ-2). Recreational Sports Journal, 38(1), 40-49. doi: 10.1123/rsj.2013-000

Dhone, A. S., & Gaikwad, M. R. (2017). Psychological factors influencing exercise adherence among young adult females in Pune city - A pilot study. *ICSSPE Bulletin, 17*(72), 41-45.

Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology, 92*(6), 1087-1101. doi:10.1037/0022-3514.92.6.1087

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment, 91*(2), 166-174.

Duncan, L. R., Hall, C. R., Wilson, P. M., & Jenny, O. (2010). Exercise motivation: A cross-sectional analysis examining its relationships with frequency, intensity, and duration of exercise. *The International Journal of Behavioral Nutrition and Physical Activity, 7,* 16- 25.

Egli, T., Bland, H. W., Melton, B. F., & Czech, D. R. (2011). Influence of age, sex, and race on college students' exercise motivation of physical activity. *Journal of Ameri can College Health, 59*(5), 399-406. doi:10.1080/07448481.2010.513074

Emery, C. F., Hauck, E. R., Blumenthal, J. (1992). Exercise adherence or maintenance among older adults: 1-year follow-up study. *Psychol Aging, 7*(3), 466-470.

Exercise motivation measurements: Scoring the BREQ-3. (n.d.). Retrieved from http://pages.bangor.ac.uk/~pes004/exercise_motivation/breq/breq.htm

Freene, N., Waddington, G., Chesworth, W., Davey, R., & Goss, J. (2011). "Physical activity at home (PAAH)", evaluation of a group versus home based physical activity program in community dwelling middle-aged adults: rationale and study design. *BMC Public Health, 11,* 883. http://doi.org/10.1186/1471-2458-11-883

Gallagher, P., Yancy WS, J., Swartout, K., Denissen, J., Kühnel, A., & Voils, C. (2012). Age and sex differences in prospective effects of health goals and motivations on daily leisure-time physical activity. *Preventive Medicine, 4*, 322-328.

Gilson, F., Standage, M., & Skevington, S. (2006) Relationships among adolescents' weight perceptions, exercise goals, exercise motivation, quality of life and leisure-time exercise behavior: a self-determination theory approach. *Health Education Research,* 1-12.

Global health and aging | National Institute on aging. (2015, January 22). Retrieved November 26, 2016, from https://www.nia.nih.gov/research/publication/global-health-

and-aging/living-longer IHRSA - About the Industry. (2016, June 30). Retrieved November 23, 2016, from http://www.ihrsa.org/about-the-industry

Jaeger, B., Freeman, S., Whalen, R., & Payne, R. (2010). *Successful students: Smart or tough?* Paper presented at 2010 Annual Conference and Exposition: Research on the First Year. American Society of Engineering Education.

Kilpatrick, Marcus, Hebert, Edward, and Bartholomew, John. (2005). College students motivation for physical activity: Differentiating men's and women's motives for sport participation and exercise. *Journal of American College Health, 54,* 87-94.

Mannetti, L., Pierro, A., Higgins, E. T., & Kruglanski, A. W. (2012). Maintaining physical exercise: how locomotion mode moderates the full attitude–intention–behavior relation. *Basic & Applied Social Psychology, 34*(4), 295-303.

Martinez, C., Gillespie, K., & Bale, S. (2014). Exercise motivation: The role of gender, age, and body mass index. *International Journal of Health, Wellness & Society, 4*(2), 55-66.

Metzgar, C. J., & Nickols-Richardson, S. M. (2015). Determinants of weight gain prevention in young adult and midlife women: study design and protocol of a randomized controlled trial. *JMIR Research Protocols, 4*(1), e36. doi:10.2196/resprot.4008

Muenks, K., Yang, J. S., & Wigfield, A. (2017). Associations between grit, motivation, and achievement in high school students. *Motivation Science,* doi:10.

Molanorouzi, K., Khoo, S., & Morris, T. (2015). Motives for adult participation in physical activity: type of activity, age, and gender. *BMC Public Health, 15,* 66-77.

Motivation. (2016). Funk & Wagnalls New World Encyclopedia.

Pearson, E. S., & Hall, C. R. (2013). Examining body image and its relationship to exercise motivation: An 18-week cardiovascular program for female initiates with overweight and obesity. *Baltic Journal of Health & Physical Activity, 5*(2), 121-131.

Pelletier, L.G., Dion, S., Tuson, K., & Green-Demers, I. (1999). Why do people fail to adopt environmental protective behaviors? Toward a taxonomy of environmental amotivation. *Journal of Applied Social Psychology, 29*, 2481–2504

Reed, J. (2014). A survey of grit and exercise behavior. *Journal of Sport Behavior, 37*(4), 390-406.

Rhodes, R., Martin, A., Taunton, J., Rhodes, E., Donnelly, M., & Elliot, J. (1999). Factors associated with exercise adherence among older adults: An individual perspective. *Sports Medicine, 28*(6), 397-411.

Robertson-Kraft, C., & Duckworth, A. (2014). True grit: Trait-level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record, 116*(3), 1-27.

Rojas, J. P., Reser, J. A., Usher, E. L., & Toland, M. D. (2012). Psychometric properties

of the academic grit scale. Lexington: University of Kentucky.

Ryan, M., & Deci, L. (2007). Intrinsic and extrinsic motivations: classic definitions and new directions. *Contemporary Educational Psychology, 25*(3), 54-67.

Ryan, M., Frederick, M., Lepes, D., Rubio N., & Sheldon., K. (1997). Intrinsic motivation and exercise adherence. *International Journal of Sport Psychology, 28*(2), 335-354.

Shin, M., Kim, I., & Kwon, S. (2014). Effect of intrinsic motivation on affective responses during and after exercise: Latent curve model analysis. *Perceptual and Motor Skills, 119*(3), 717-730.

Sidman, C. L., Fiala, K. A., & D'Abundo, M. L. (2011). Exercise motivation of college students in online, face-to-face, and blended basic studies physical activity and wellness course delivery formats. *Journal of American College Health, 59*(7), 662-664.

Smith, A., Ntoumanis, N., & Duda, J. (2007). Goal striving, goal attainment, and well-being: adapting and testing the self-concordance model in sport. *Journal of Sport & Exercise Psychology, 29*(6), 763-782.

Teixeira, P. J., Silva, M. N., Ryan, R. M., Carra©'a, E. V., & Markland, D. (2012). Exercise, physical activity, and self-determination theory: A systematic review [electronic source]. *International Journal of Behavioral Nutrition And Physical Activity, 9*(1), 609.

Theodorakis, N., Alexandris, K., Rodriguez, P., & Sarmento, P. J. (2004). Measuring customer satisfaction in the context of health clubs in Portugal. *International Sports Journal, 8*(1), 44-53.

Tran, N. (2014, December 14). *What is self-determination theory? (PDF) - Positive psychology program.* Retrieved from https://positivepsychologyprogram.com/self-determination-theory/

Vallerand, R. J. (1997). *Toward a hierarchical model of intrinsic and extrinsic motivation.* In M. P. Zanna (Ed.). Advances in experimental social psychology (pp. 271–360). New York, NY: Academic Press.

Vallerand, R. J., & Losier, G. F. (1999). An integrative analysis of intrinsic and extrinsic motivation in sport. *Journal of Applied Sport Psychology, 11*(1), 142-169. doi:10.1080/10413209908402956

Vlachopoulos, S. P., & Gigoudi, M. A. (2008). Why don't you exercise? Development of the amotivation toward exercise scale among older inactive individuals. *Journal of Aging & Physical Activity, 16*(3), 316-341.

Whaley, D. E., & Schrider, A. F. (2005). The process of adult exercise adherence: Self-perceptions and competence. *Sport Psychologist, 19*(2), 148 -163.

Williams P, Lord SR. (1995). Predictors of adherence to a structured exercise program for older women. *Psychol Aging, 10,* 617-24.