

R. Jeremiah Wofford THE FIVE-FACTOR MODEL OF PERSONALITY AND ITS RELATION TO PHYSICAL ACTIVITY TYPE (Under the direction of Dr. Bhibha M. Das) Department of Kinesiology, April 2017

Previous research has linked components of the Five-Factor model of personality to physical health and well-being. The strength of these relationships with specific exercise behaviors is, however, not yet known, which may impact how practitioners prescribe exercise. For this reason, it is important to find ways to utilize personality to provide stronger exercise prescriptions for inactive individuals. **Purpose:** The aim of this pilot, exploratory study was to assess the relationship between personality types and individual exercise preference. **Methods:** Women (N = 51) between the ages of 30 and 50 years completed a demographic survey, the IPIP Big 5 personality questionnaire, the Physical Activity Enjoyment scale, the Godin Leisure-Time Exercise questionnaire, and a Lifestyle-Related Self-Concept questionnaire. A Chi squared test was performed to determine the relationship between personality and preferred physical activity modality. **Results:** Participants of the study had an average age of 38.9 ± 6.4 years and were 78.8% White and 17.6% Black or African American. Of the total participants, 31.4% completed an undergraduate degree and 51% completed a post-graduate education. Eighteen (35.3%) participants had an annual income below \$50,000, 27 participants (52.9%) were between \$50,000 and \$99,999, and 5 participants (9.8%) had an annual income greater than \$100,000. The Pearson chi-square test comparing 5 different modes of exercise resulted in a value of 30.185 ($p = 0.02$). A second chi-square test that combined all group fitness classes and compared them with Crossfit and individual exercises resulted in a value of 16.179 ($p = 0.04$). Thus, personality type was significantly correlated with preferred mode of exercise. An ANOVA comparing personality scales of personality with preferred exercise resulted in a significant value

for only the conscientious domain ($p=.01$). This suggested that conscientious individuals would prefer crossfit and aerobic based group classes.

Conclusions: Personality did significantly differentiate individuals based on their preferred mode. Significant results note differences in individuals that participate in group fitness classes, Crossfit, and individual exercises. Given the proportion of the population that does not meet physical activity and public health recommendations, it would be beneficial to utilize this relationship to better prescribe tailored physical activity rather than providing overarching recommendations to individuals. An intervention prescribing physical activity based on an individual's personality type is needed to further the understanding of the relationships presented.

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AND ITS RELATION TO PHYSICAL ACTIVITY TYPE

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Chapter 1: Introduction

Physical activity is an effective treatment for many diseases that reduce lifespan and the quality of life (Watson & Baar, 2014). Unfortunately, physical inactivity is one of the most important public health problems of the 21st century, and may even be the most important (Blair, 2009). About 1 in 5 (21%) US adults meet the 2008 physical activity guidelines and 75% of the population drops out of structured physical activity within 3 years of starting an activity protocol (CDC, 2014). This is an extremely dismal amount of the population that is failing to even meet the minimum physical activity and public health guidelines of participating in at least 150 minutes of moderate-intensity aerobic activity, at least 75 minutes of vigorous-intensity aerobic activity, or an equivalent combination of the two (Carlson, Fulton, Pratt, Yang, & Adams, 2015; USDHHS, 2015). For this reason, it is not surprising that physical activity is being promoted to improve health. Exercise referral/prescription schemes were developed to do just that. Exercise referral/prescription schemes aim to identify adults who are inactive and pair them with a service that would be responsible for prescribing and monitoring an individualized physical activity program (Pavey et al., 2011). Exercise referral/prescription schemes intend to improve physical activity participation in sedentary individuals (Williams, Hendry, France, Lewis, & Wilkinson, 2007). Williams, Henry, France, Lewis, and Wilkinson (2007) examined exercise referral/prescription schemes and their effectiveness at promoting physical activity in adults. It was determined that exercise referral schemes have a small effect on increasing physical activity in sedentary individuals (Williams et al., 2007). This finding suggests that exercise referral/prescription is not an effective way to increase physical activity. This information then leads us to ask how to prescribe physical activity more effectively and the overarching question remains, how do people become and remain active?

There are many options in today's society for being physically active. Within the four main modes of physical activity (aerobic, muscle-strengthening, bone-strengthening, and stretching) the types of activities are endless. Physical activity programs are centered on each of the modes of physical activity and offer ways to engage individually or in group settings. A few of the most popular programs today are mind and body classes, aerobic classes, strength training classes, Crossfit, and individual programs focusing on one or all of these types.

Many factors attribute to whether or not an individual adheres to a physical activity program. Factors that induce adults to initiate and maintain programs of physical activity have been divided into those that are invariable (e.g., age, gender, race, ethnicity) and those that are presumed to be modifiable (e.g., behavioral and personality characteristics, environmental circumstances and community settings) (Seefeldt, Malina, & Clark, 2012). Adherence to physical activity could be as simple as an individual responding better to outdoor physical activity versus indoor (Lacharité-Lemieux, Brunelle, & Dionne, 2015) or that the individual needs extrinsic motivation more than intrinsic motivation to stay active (Ryan & Deci, 2000). The level of enjoyment of physical activity has also been related to physical activity behavior. Greater physical activity enjoyment appears to influence individual's self-reported ability to engage in regular physical activity (Lewis, Williams, Frayeh, & Marcus, 2016). With the amount of factors that could possibly influence adoption and adherence of physical activity, it can be hard to pinpoint an exact causation and the causal factors are most likely different from individual to individual. The individuality of a person's factors are most likely centered around modifiable factors, such as behavioral and personality characteristics. Personality is defined as the totality of an individual's behavioral and emotional characteristics (Merriam-Webster, 2016). Considering that personality types have been found to be related to many aspects of human

behaviors and that the characteristics of each dimension can explain why each one is related to certain behaviors (Gerlach, Herpertz, & Loeber, 2015), personality may hold key to unveiling the link between individuals and physical activity adherence.

In order to test personality type, one of the many personality assessments needs to be used. One of the most widely accepted assessments of personality is the Five-Factor Model of personality. The Five-Factor Model of personality is a hierarchical model of trait structure, in which relatively narrow and specific traits are organized in terms of five broad factors (McCrae & Allik, 2002). The five broad factors of the Five-Factor Model include: Extraversion, Openness, Conscientiousness, Neuroticism, and Agreeableness (Gurven, von Rueden, Massenkoff, Kaplan, & Vie, 2013). Extraversion includes characteristics such as warmth, gregariousness, assertiveness, and excitement seeking. Openness is concentrated on fantast, aesthetic feelings, ideas, and values. Conscientiousness involves traits like competence, dutifulness, achievement striving, and deliberation. Neuroticism is centered on anxiety, angry hostility, self-consciousness, and impulsiveness while, Agreeableness highlights trust, altruism, modesty, and tender-mindedness (Gerlach et al., 2015).

In terms of personality type and health, many studies have been developed to test the correlations between personality and who will be physically active, personality and obesity, personality and the amounts of physical activity, and personality and weight loss. In regards to who will be physically active, it was established that Extraversion, Neuroticism, and Conscientiousness are correlates of physical activity; but, no correlation was found with Openness and Agreeableness (Rhodes & Smith, 2006). It has been concluded that personality type is related to being underweight and overweight (Kakizaki et al., 2008). In particular, individuals with higher Neuroticism or Extraversion and individuals with lower

Conscientiousness tend to have a higher BMI. High Neuroticism and low Conscientiousness are associated with weight fluctuations over time and low Agreeableness is related to a greater increase in BMI across the lifespan (Sutin, Ferrucci, Zonderman, & Terracciano, 2011). Another study assessed a relationship between two components of the Five-Factor Model (Neuroticism and Extraversion) and physical activity but concluded that the relationship between physical activity and personality may differ according to the method used to measure physical activity (Wilson, Das, Evans, & Dishman, 2015). From studying weight loss, only Neuroticism was found to have a link with effective weight loss that included weight loss treatment by facilitating dietary compliance with enhanced satiety (Munro, Bore, Munro, & Garg, 2011).

From the previous studies, it can be seen that at least three components of the 5-Factor model of personality (Neuroticism, Extraversion, and Conscientiousness) have been linked to physical health and well-being in some way or another. Unfortunately, however, there has been no significant relationship found that would allow physical activity referral/prescription to occur more effectively. Previous research has sought to connect personality with broad health behaviors. To move forward, taking note of the different types of personality, along with the fact that there are many types of physical activity, could lead us to a much stronger relationship.

Purpose

The purpose of this exploratory study was to determine if there was an association between the 5-Factor model of personality types and individual physical activity preference, physical activity enjoyment, and leisure-time physical activity. This study also served to compare personality types of individuals in the physical activity adherers and non-adherers categories.

Hypotheses

It was hypothesized that physical activity program preference was directly related to components of the Five-Factor Model of personality and that each type of program will differ in the type of personality. It was also hypothesized that physical activity enjoyment and adherence levels would differ according to personality types. It does not seem likely that all 5 factors will have the same relationship with these categories seeing as how previous research has only shown that three of the factors are consistently related with other health behaviors.

Significance

Previous studies have indicated that personality is related to different aspects of health and physical activity. These studies could not, however, determine if one personality type is more physically active than another. Because individuals have their own preference of how they are active and what they will adhere to, the previous literature could be asking the wrong question. If individuals of a certain personality are observed on their activity but have yet to find activity that they enjoy, it will be perceived that they are not often active. Perhaps they are only inactive because they have yet to find an activity they feel is worth adhering to and that personality is a key factor in determining these activities. The present exploratory study investigated the idea that personality type is related to an individual's physical activity preference, physical activity enjoyment, and physical activity adherence. This study will add new understanding to the literature about personality and its contributions to physical activity.

Delimitations

1. All subjects will be female and between the ages of 30-50 years. This delimitation is set based on the idea that personality should not fluctuate for individuals in this age group.

Limitations

1. The analysis is limited to the subjectivity of the measures.
2. This study assumes all people fall into one of the five personality domains of the Big Five.
3. The accuracy of data is limited by the use of self-report data collection.

Chapter 2: Literature Review

Introduction

This review holds the purpose of analyzing and cohering previous scientific literature to aid in the background of this study. The review will include information from the literature on the benefits of physical activity, problems with physical activity referrals, physical activity adherence factors, personality, and previous studies relating personality and physical activity.

Benefits of Physical Activity

Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure (Caspersen, Powell, & Christenson, 1985). Exercise is often interchanged with physical activity, but they are not in fact synonymous. Exercise is a subset of physical activity (Caspersen et al. 1985). Exercise is physical activity that is planned, structured, repetitive, and purposeful in order to improve or maintain one or more components of physical fitness (Caspersen et al., 1985). The health benefits of regular physical activity and their relation with chronic disease morbidity and mortality are well established (Kraus et al., 2015). Regular physical activity is associated with important health benefits, including reduced risk of premature death, cardiovascular disease, ischemic stroke, type 2 diabetes, colon and breast cancers, and depression (Carlson et al., 2015). Current national guidelines for aerobic physical activity recommended for substantial health benefits states that adults should participate in at least 150 minutes of moderate-intensity aerobic activity, at least 75 minutes of vigorous-intensity aerobic activity, or an equivalent combination of the two over a 7-day period (Carlson et al., 2015) (USDHHS, 2015). Increasing evidence suggests that participating in no more than 1 hour per week of moderate-intensity physical activity is associated with lower risk of all-cause mortality and incidence of coronary heart disease (Press, 2009).

Problems with Physical activity Referrals/Prescription

Despite the health benefits of regular physical activity, the majority of people remain sedentary (Williams et al., 2007). In order to combat the increase in sedentary individuals, physical activity recommendations were created (Anokye et al., 2011). These guidelines, although important, are not sufficient enough to increase physical activity at the population level (Franklin, Brinks, & Sternburgh, 2010). It is for this reason that physical activity referral/prescription schemes have become a more common intervention to promote physical activity in individuals (Anokye et al., 2011). The aim of physical activity referral/prescription schemes is to identify inactive adults in the primary-care setting and then to refer the patient to a third-party service that would take responsibility for prescribing and monitoring an physical activity program for the individual (Pavey et al., 2011).

If a program is going to alleviate a problem, it first has to be successful at fulfilling its intended purpose. The intended purpose of physical activity referral/prescription schemes is to improve physical activity participation in sedentary individuals (Williams et al., 2007). One study's aim was to assess whether exercise-referral schemes are effective in improving exercise participation in sedentary adults. To do this, previous referral studies were combined and compared through meta-analysis. From the studies, it was established that there was a statistically significant increase in the number of participants doing moderate exercise. The combined analysis had a relative risk (RR) value for becoming moderately active of 1.20. However, 17 sedentary adults would need to be referred in order for just one individual to become moderately active. This suggests that exercise referral/prescription is not an effective way to increase physical activity.

In the United States alone, about one in five (21%) adults meet the 2008 physical activity guidelines and 75% of the population drops out of exercise within three years of starting (CDC, 2014). It is safe to assume that any efforts to increase physical activity are not effectively doing so on a national level. Exercise referral/prescription has little effect on increasing physical activity in sedentary individuals. The key challenge for future referrals, is to increase uptake and improve adherence (Williams et al., 2007). To understand how uptake and adherence can be improved, research must first focus on factors that affect exercise adherence.

The cost-effectiveness of any program comes into question when it is being implemented. To validate the exercise referral/prescription schemes, studies have been conducted comparing the cost-effectiveness of exercise referral schemes in promoting physical activity to that of usual primary care. It was determined that exercise referral schemes are associated with modest increases in lifetime costs and benefits. When comparing total healthcare costs per person using exercise referral schemes and usual health care, exercise referral schemes exhibited a 7.3% increase in cost (Anokye et al., 2011). The cost-effectiveness is highly sensitive to small changes in the effectiveness of exercise referral schemes (Anokye et al., 2011). In regards to effectiveness, the probability of becoming active after exposure to exercise referral schemes is 0.35 whereas, the probability of becoming active after exposure to usual care is 0.30 (Pavey et al., 2011). This difference in effectiveness shows no significant change from usual care to exercise referral and illustrates the void of knowledge in how to best prescribe physical activity. There remains some major uncertainties about whether the evidence is applicable to all populations and that there may be good reason to believe that uptake, adherence, and effectiveness might differ according to the characteristics of the recipients (Anokye et al., 2011).

Modes of Physical Activity

When it comes to being physically active, there are a variety of options available for an individual to choose. Choosing an appropriate form of physical activity can often be daunting and difficult for a beginner. It can be just as difficult for someone to prescribe physical activity that an individual will enjoy. Most physical activity is centered on four main modes: aerobic, muscle-strengthening, bone-strengthening, and stretching. Each of these categories benefits the body in different ways. Aerobic activity stimulates and strengthens the heart and lungs, thereby improving the body's utilization of oxygen and include activities such as running, walking, bicycling, dancing, and jumping jacks (Quah & Cockerman, 2016). Muscle strengthening activities improve the strength, power, and endurance of your muscles. This category includes activities like pushups, sit-ups, lifting weights, and climbing stairs (Quah & Cockerman, 2016). With bone-strengthening activities, your feet, legs, or arms support your body's weight, and your muscles push against your bones to improve bone strength. Stretching activities help improve the flexibility and the ability to fully move the joints (Quah & Cockerman, 2016).

Not only are there multiple options for the mode of physical activity, but there are also options for the intensity as well. All types of physical activity fall under three domains of intensity: light, moderate, and vigorous. Light intensity activities are commonly daily activities that do not require much effort (Ainsworth et al., 1993). These activities are characterized by having less than 3.0 METS. Moderate physical activity has MET values between 3.0 and 6.0 and cause the heart, lungs, and blood vessels to work harder than light physical activity (Ainsworth et al., 1993). Vigorous intensity activities are any activities with MET values at 6.0 or higher (Ainsworth et al., 1993).

Seeing as how activities differ in the way they affect the body, individual preference will come into play on whether or not a person adheres to a specific physical activity. Determining the relationship of these preferences would possibly help with physical activity prescription and adherence.

Exercise Adherence Factors

Adherence can be defined as commitment to a behavioral standard established as part of a negotiated agreement, alliance or contract, particularly in the context of behavioral change, therapeutic intervention and/or medical treatment (Dishman, 1981). For exercise adherence, it is commonly reported that approximately half of participants drop out within the first six months before the salutary benefits of exercise are realized or identified (Carmody, Senner, Malinow, & Matarazzo, 1980). Some of these salutary benefits are intrinsic motives for being physically active. Intrinsic motivation is defined as the doing of an activity for its inherent satisfactions rather than for some separable consequence (Ryan & Deci, 2000). Not all people feel intrinsic factors when beginning physical activity or exercise. Many individuals beginning exercise do so because of extrinsic motivation, which refers to doing something because it leads to a separable outcome. What remains unknown is what factors separate the physically active from the inactive. Age, education, gender, ethnicity, previous activity, dietary habits, smoking, occupation, and social support are all variables associated with exercise and physical activity adherence (Herring, Sailors, & Bray, 2014). In order to improve intervention adherence, a better understanding of the predisposition to health and risk behavior that results from the complex interplay of biological, psychological, environmental, and genetic factors is needed (Herring et al., 2014).

A study by Arikawa et al. (2012) sought to identify factors associated with attrition and adherence of young women in a 16-week randomized aerobic exercise intervention. Two

hundred and twelve women (25.4 ± 3.3 years) were included in an exercise group that was prescribed a progressive-weight bearing aerobic exercise program consisting of 30-minute workouts, five times a week for 16 weeks. Forty-six of the original 212 women dropped out of the intervention. Of those 46, 82.5% dropped out during the earlier stages of exercise. The most prominent reasons for these drop outs were time commitments ($n = 19$), health concerns/injury ($n = 7$), and relocations ($n = 6$), followed by less common reasons such as pregnancy and family problems. This suggests that many reasons for withdrawal derive from difficulties with initiating physical activity. Seventy eight percent of the participants completed the intervention, however, only 4.7% of the participants exercised for the entire 150 minutes per week during the entire study. From the baseline measurements, only self-reported physical activity and levels of depression were concluded to be predictors of exercise adherence measured as mean total minutes of exercise per week. From a multiple regression model, self-reported physical activity had a Beta value of 0.64 (SE= 0.21) at $p < .002$ and depression had a beta value of -0.84 (SE=0.35) at $p < .02$ (Arikawa, O'Dougherty, Kaufman, Schmitz, & Kurzer, 2012). Attrition can be most attributed to time commitments and problems with initiating physical activity while self-reported physical activity and depression were considered predictors of adherence. This finding poses an interesting challenge to researchers conducting exercise interventions as those who are the least active might be the ones who benefit the most from exercise, but also the ones who are most likely to drop out (Arikawa et al., 2012).

Another study focused on factors related to adherence to an exercise program for healthy adults. Gale et al. (1984) conducted an intervention including healthy men and women (age ≈ 32 , $N = 106$) participating in a 6-month exercise program three mornings per week. The program consisted of a variety of activities including stretching, calisthenics, jogging, relaxation, simple

games, weight training, and aerobic dance and the activities varied from day to day. Their attendance scores were compared to a variety of physiological, anthropometric, psychological, and demographic variables. The subjects were also grouped by their adherence patterns. Early dropouts were considered subjects that attended less than 10% of the classes. Non-adherers were the subjects that attended between 10 and 50% of the classes. Adherers were the subjects that completed more than 50% of the classes. Of the study, 18% of the subjects were early dropouts, 40% of the subjects were non-adherers, and 42% of the subjects were adherers. Certain patterns emerged from each of these categories and 11 characteristics were identified which at least marginally distinguished these patterns. The 11 categories and the respective predictive values were self-motivation scores (47%), flexibility (68%), percent fat (69%), VO_{2max} (65%), years at present address (83%), times changed address in 5 years (65%), age (59%), number of children (63%), years in present occupation (83%), occupation (70%), and marital status (69%). The early dropout men and women were more likely to have less stability in the community, to be single, and to have no children. "Blue collar" men were surprisingly more likely to have a higher dropout rate. This result was surprising due to the fact that less community stability is related to dropouts and blue-collar men are considered stable in the community (Gale, Eckhoff, Mogel, & Rodnick, 1984). The more physically fit women and the less physically fit men were more likely to continue the program for more than 10 percent of its duration. Although these trends were seen within the categories, using these positive scores did not improve the ability to predict attendance behavior. It was concluded that participant characteristics are not good predictors of compliance to an exercise (Gale et al., 1984). However, this does exhibit the idea that there is still no certain trait that predicts adherence to physical activity and that the discovery of such a trait could lead to a better understanding of physical activity patterns.

The level of enjoyment of physical activity has also been related to physical activity behavior. One study focused on perceived enjoyment as a predictor of physical activity. Participants were low-active adults participating in a physical activity promotion intervention. A total of 448 participants were involved and they completed physical activity and enjoyment measures at baseline, six, and twelve months. These measures were used to calculate the effect of both baseline and six-month enjoyment on twelve-month physical activity. Baseline physical activity enjoyment had a $\beta = .24$ ($p < .000$) for its effect on twelve-month physical activity. Six-month physical activity enjoyment had a $\beta = .24$ ($p < .000$) for its effect on twelve-month physical activity. Greater physical activity enjoyment appears to influence individual's self-reported ability to engage in regular physical activity (Lewis et al., 2016). If physical activity enjoyment is related to participation in physical activity, now the question remains: What makes us enjoy the things that we do?

Personality

Personality is defined as the totality of an individual's behavioral and emotional characteristics (Merriam-Webster, 2016). Personality has been used to create many psychological theories throughout the years. Most of these theories aim to describe systematic patterns of stable individual differences in behavior, sometimes including affect, emotion, and motivations. These theories also investigate how the aforementioned patterns influence future behavior (Ozer & Benet-Martínez, 2006). Because personality traits are defined by cognitive, emotional, and behavioral patterns that contribute to health outcomes, such associations may explicate the role of personality in disease progressions or interventions (Sutin et al., 2011).

Personality Types

Personality types have been found to be related to many aspects of the human life. Personality has also been used to predict and understand a multitude of behaviors. In order to understand how personality can explain or relate to a behavior, we must first look at the different types of personalities. There are many models that can be used to understand personality. One of the most widely accepted models of personality is the five-factor model (Gurven et al., 2013). The five-factor model is a construct describing personality variation along five dimensions (i.e., the Big Five): Extraversion, Openness, Conscientiousness, Neuroticism, and Agreeableness (Gurven et al., 2013). It has been argued by many researchers that the structure of this model is a “biologically based human universal” that surpasses the barrier of language and cultural differences (Bouchard & Loehlin, 2001). Despite differences in culture, history, social life, economy, and many other forms of cultural and behavioral expressions, the same intrinsic personality types should be found across the globe (Gurven et al., 2013). The five dimensions of this model have even been found to be applicable to captive chimpanzees after being rated by zoo keepers (Weiss, King, & Figueredo, 2000).

Understanding the characteristics of each dimension can explain why each one is related to certain behaviors. Table 1 lists the facets of each personality domain.

Table 1- Personality Domains

Personality Domains				
Openness	Extraversion	Conscientiousness	Neuroticism	Agreeableness
Imaginative	Socially Stimulated	Efficient	Low Self Esteem	Sympathetic
Adventurous	Energetic	Thorough	Anxious	Gentle
Spontaneous	Enthusiastic	Organized	Irritable	Trusting
	Pleasure Seeking	Hard Working	Worrying	Warm

Measures of the Big Five factors of personality have been used to predict a variety of behaviors of some social and cultural significance (Paunonen, 2003). The belief is that personality-based variations in behavior are largely interpretable in terms of the Big Five Factors of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness (R. R. McCrae & John, 1992). Results of many studies have exhibited substantial consistency in behavior predictions across the different Big Five assessments including behaviors such as alcohol consumption (correlation of 0.30 with Extraversion at $p < .001$ and a correlation of -0.26 with Conscientiousness at $p < .001$) and grade point average (correlation of 0.27 at $p < .001$) (Paunonen, 2003). A study among college students by Raynor et al. (2009) collected results that imply that highly conscientious individuals were more likely to wear seat belts (standardized $\beta = 0.22$, $p < .01$), utilize alcohol-related harm reduction (standardized $\beta = 0.19$, $p < .01$), exercise (standardized $\beta = 0.13$, $p < .01$), get enough sleep (standardized $\beta = 0.15$, $p < .01$), and consume more fruits and vegetables (standardized $\beta = 0.16$, $p < .01$). Highly conscientious individuals

were also less likely to smoke cigarettes (standardized $\beta = -0.15$, $p < .01$), consume alcohol (standardized $\beta = -0.19$, $p < .01$), and binge drink (standardized $\beta = -0.18$, $p < .01$). On the contrary, highly extraverted individuals were more likely to smoke cigarettes (standardized $\beta = 0.18$, $p < .01$), consume alcohol (standardized $\beta = 0.25$, $p < .01$), binge drink (standardized $\beta = 0.29$, $p < .01$), and have multiple sexual partners (standardized $\beta = 0.26$, $p < .01$). Highly extraverted individuals were also less likely to engage in alcohol-related harm reduction (standardized $\beta = -0.18$, $p < .01$), use condoms (standardized $\beta = -0.25$, $p < .01$), and get enough sleep (standardized $\beta = -0.18$, $p < .01$). These results support the indication that the domains of personality are strong concomitants of health behaviors (Raynor & Levine, 2009).

Since personality has been linked to many different behaviors, its stability throughout an individual's lifetime has come into question to determine whether or not personalities and behaviors will change. Rantanen et al. (2007) conducted a study to examine the stability of personality traits across the developmental transition from early adulthood (age 33) to middle age (age 42). Participants included 89 men and 103 women who were drawn from an existing study of personality and social development. The structural equation modeling analyses insisted that there were both gender differences and similarities in the rank-order stability of the Big Five. Openness, Agreeableness, and Conscientiousness had similar stabilities in men as they did in women. Neuroticism and Extraversion, however, were more stable in men than in women. For stability, open men showed a Pearson intercorrelations value of 0.79 at $p < .0001$ and open women had an r value of 0.81 at $p < .0001$. Similarly, agreeable men had an r value of 0.66 at $p < .0001$ and agreeable women had an r value of 0.71 at $p < .0001$. Conscientious men had an r value of 0.64 at $p < .0001$ and conscientious women showed an r value of 0.62 at $p < .0001$. Neurotic men had an r value of 0.76 at $p < .0001$ and neurotic women showed an r value of 0.55

at $p < .0001$. Extraverted men had an r value of 0.81 at $p < .0001$ and extraverted women had an r value of 0.56 at $p < .0001$. Over the 9-year span, the mean-level of Neuroticism decreased whereas the mean-level of Extraversion, Openness, Agreeableness, and Conscientiousness increased. The stability coefficients for the Big Five personality traits over the longitudinal study ranged from 0.73 to 0.97 in men and from 0.65 to 0.95 in women. Given that these coefficients were moderate to high, personality type can be considered relatively stable throughout early adulthood (Rantanen, MetsäPelto, Feldt, Pulkkinen, & Kokko, 2007).

Because personality can be linked to so many behaviors, it is not unreasonable to question whether personality is related to other behaviors. There has yet to be an identified trait to explain or predict physical activity adherence. It is unknown how personality relate to health behaviors, and more specifically, how it relates to physical activity.

Previous Studies- Personality and Health Behaviors

Many researchers theorize that personality has a biological or genetic basis. For this reason, many scientists hypothesize that personality can correlate with aspects of life (Weiss et al., 2000). In regards to health, personality's relation to physical activity and physical well-being has been tested in many studies. Personality correlational studies have been created for predicting who will be physically active, for predicting obesity and body mass index, for predicting diet induced weight loss and weight management, for predicting how physically active an individual would be, and many more. These studies give us a better understanding of the role personality plays in regards to the behaviors and characteristics that an individual exhibits.

Body weight contributes to the way we perceive others and ourselves (Sutin et al., 2011). This finding seems plausible because body weight reflects our behaviors and lifestyle. Studies have found that personality it is associated with both being overweight and underweight

(Kakizaki et al., 2008). Sutin et al. (2011) performed a longitudinal study over 50 years, where personality traits were tested with multiple measures of adiposity and body mass index. Nearly 15,000 anthropometric assessments were measured and compared with the course of body mass index throughout adulthood. Of the sample, approximately 45% of participants were in the normal weight range, 38% were overweight, and 17% were obese. Compared with normal-weight participants, overweight and obese participants scored higher on both Neuroticism and Extraversion. In regards to Neuroticism in mean-level differences in adjusted personality traits, normal-weight individuals scored an average of 47.01 (SD = .33), overweight individuals scored an average of 48.16 (SD = .35), and obese individuals scored an average of 48.78 (SD = .53). This same linear relationship was seen with Extraversion, with normal-weight individuals scoring an average of 50.37 (SD = .34), overweight individuals scoring an average of 51.74 (SD = .37), and obese individuals scoring an average of 52.38 (SD = .56). Conscientiousness, however, portrayed a negative linear relationship. Normal-weight individuals scored an average of 50.97 (SD = .35), overweight individuals scored an average of 50.40 (SD = .37), and obese individuals scored an average of 49.34 (SD = .57). These results suggest that participants with higher Neuroticism or Extraversion or lower Conscientiousness have a higher BMI. Participants with high impulsivity (highest 10%), which is a facet of Neuroticism, showed an average of 11kg more in weight than those with low impulsivity (lowest 10%). Using a simple standard deviation and estimates from Hierarchical Linear Modeling (HLM), virtually identical associations were found between weight fluctuations and personality. Neuroticism had a standard deviation of .07 for both measures of standard deviation for BMI fluctuations, Extraversion was -0.2 for both measures, Openness was -0.1 for both measures, Agreeableness was -0.1 for both measures, and Conscientiousness was -0.8 for simple standard deviation and -0.9 for HLM. High Neuroticism

and low Conscientiousness are associated with greater weight fluctuations over time. Low Agreeableness and impulsivity-related traits were associated with a greater increase in BMI across the adult lifespan. For example, on average, at age 30, those who scored one standard deviation above the mean on impulsivity had a BMI that was approximately 2.30 points higher than those who scored one standard deviation below the mean on this trait. By age 90, this gap increased to a 5.22 BMI point difference. This type of relationship could help with prevention of drastic weight fluctuations of those individuals projected to show the most changes by allowing researchers and practitioners to focus on the behaviors that are causing these known fluctuations.

Similar research has studied the relationship between personality traits and the objective and subjective experience. Of the number of ways to distinguish and measure the subjective experience, self-reported weight and height and perception of body weight are two that are focused on. Misreported weight and height are associated with theoretically meaningful individual differences in psychological functioning (Sutin, 2013). Individuals who are considered more pessimistic over report their weight whereas individuals who are more optimistic under report their weight (Sutin, 2013). Along with BMI and obesity, personality traits have been involved in the subjective evaluation of body weight. For example, individuals high in neuroticism tend to be dissatisfied with their bodies ($r = .39, p < .001$) (Dionne & Davis, 2004) and be more preoccupied with their weight ($r = .49, p < .01$) (Davis, Shuster, Blackmore, & Fox, 2004). Individuals high in neuroticism also perceive greater discrepancies between their actual and ideal bodies, whereas individuals high in extraversion report greater appreciation of their bodies and have a greater assessment between actual and ideal body weight (Swami et al., 2013). In one particular study by Sutin (2013), associations between personality traits and discrepancies between subjective perception and actual BMI were tested. Conscientious participants perceived

themselves as a thinner weight category than they measured with a logistic regression coefficient of 1.14 at $p < .01$ ($n = 3,232$) and neurotic participants perceived themselves as heavier than they actually measured with a logistic regression coefficient of 1.09 at $p < .01$ ($n = 876$). Participants higher on extraversion, openness, and agreeableness did not show significant associations. The relationship between personality and self-perception may help us understand why certain individuals are more likely to participate and adhere to physical activity programs.

A common challenge for successful weight management is adapting programs to individuals. A study by Munro, Bore, Munro, and Garg (2011) was used to investigate whether personality traits could be used to match individuals to a compatible weight loss program. Two separate weight loss trials were conducted: one with a slow, healthy eating weight loss diet and one with a fast, very low energy diet. Anthropometric measures were recorded at baseline and throughout the study. Personality traits were also measured at baseline using three scales from the Five Factor Model- Neuroticism, Conscientiousness, and Extraversion. Weight loss on the slow, healthy eating was correlated positively ($r = .41$) with anxiety, which is a component of Neuroticism. Anxiety had a weight loss correlation of .41 and a BMI change correlation of .41 for the slow, healthy eating, which was higher than any other component or facet meaning that anxious individuals respond better than other individuals to this type of diet. Weight loss from the very low energy diet was also positively correlated with Neuroticism but was negatively correlated with components of Conscientiousness. For the very low energy diet, had a weight loss correlation of .50 and a BMI change coefficient of .50 whereas Conscientiousness had a weight loss coefficient of -.30 and a BMI change coefficient of -.29. The major finding of this study, based on its high correlational data, was that there was a link between the personality factor, Neuroticism, and effective weight loss with a particular weight loss treatment that

facilitates dietary compliance with enhanced satiety. Unfortunately, no strong relationship was found between any of the other personality types. Stronger relationships with the other domains could exist if other types of diets were included in the study and would suggest that each domain prefers a different type of diet. As of now, however, the data shown suggests that personality is not strongly enough related with diets to influence behaviors.

Furthering on the nutritional behaviors, Bruijn et al. (2005) examined personality's relationship to fruit and vegetable intake and physical activity in adolescents. Adolescents between the ages of 12 and 18 were recruited for this study. Participants' behavioral outcomes and personality were assessed with validated self-administered questionnaires. This data collection occurred twice with two separate samples. The first sample included 504 adolescents with a mean age of 14.5 years (SD = 1.7). The second sample included 476 adolescents with a mean age of 14.9 years (SD = 2.0). Because the two samples had no differences in demographic variables, the samples were combined to allow greater statistical power. Associations between personality and behaviors were found through bivariate correlations, multiple regression analyses, and Cohen's effect sizes. Agreeableness was found to be positively associated with vegetable consumption (0.42, $p < 0.001$). Openness was positively associated with fruit (0.14; $p < 0.001$) and vegetable (0.20; $p < 0.001$) consumption. Extraversion was the only personality domain that was found to have a significant positive association with sports-related physical activity (0.11, $p < 0.001$). No significant correlations were found with routine physical activity. The results of this study suggest that the personality dimensions of agreeable and open are associated with fruit and vegetable consumption and extraversion is related to sports-related physical activity (Bruijn, Kremers, Mechelen, & Brug, 2005).

Although the research has been minimal, a couple studies have sought to research the

association between personality and muscle strength. The first, an Australian study, investigated correlations between neuroticism and extraversion and muscle strength. Neuroticism was found to be negatively correlated to strength in women only, while extraversion did not (Jorm et al., 1993). Furthering this study, Tolea et al. (2012) studied the association between personality, muscle strength, and activity levels. Personality traits pertaining to neuroticism and extraversion were associated with relative knee muscle strength. Neuroticism was negatively associated with muscle strength with a linear regression coefficient of -0.05 ($p < 0.001$). More specifically, each one standard deviation increase in neuroticism was associated with 0.050 Nm/kg ($p < 0.001$) lower muscle strength. A positive association was observed for extraversion and remained significant with a linear regression coefficient of 0.03 ($p = 0.04$) even when all other personality domains were considered. In regards to personality traits associated with physical activity and strength, only conscientiousness ($\beta = -0.05$, $p = 0.04$), extraversion ($\beta = 0.05$, $p = 0.03$), and a few other personality facets (warmth ($\beta = 0.06$, $p = 0.02$), activity ($\beta = 0.11$, $p < 0.001$), and positive emotions ($\beta = 0.05$, $p = 0.04$) were associated with physical activity. Physical activity was found to positively correlate with muscle strength independently of personality, socio-demographic, and health-related factors. It was concluded that several personality traits were associated with muscle strength partially through an effect on physical activity level. Given the importance of muscle strength on maintaining functional independence and that muscle strength can be improved, it may be instructive to examine how positive elements of personality may be applied in developing programs aimed at maintaining strength and physical function (Tolea et al., 2012).

Similarly, Rhodes et al (2001) conducted research on breast cancer survivors to investigate the relationship between personality and exercise participation. One hundred and seventy five non-metastatic, female, breast cancer survivors with a mean age of 52.3 (SD = 9.4)

were recruited for the research. All participants completed questionnaires that assessed demographic and medical information, personality, and exercise stage recall throughout their cancer diagnosis and treatment (prediagnosis, during treatment, and post treatment). Personality was measured using the NEO-Five Factor Inventory. In terms of exercise participation, four stages of exercise were used to categorize the participants. The categories included Precontemplation, Contemplation, Preparation, and Action/Maintenance. For the treatment stage, a multivariate analysis of variance resulted in a Wilk's λ of 0.85 ($F(5,168)=1.90$; $p < 0.05$). Univariate F-tests showed significant differences for the relationships between personality types of Neuroticism and Extraversion and exercise stage. Neuroticism in contemplators (23.33 ± 5.95) was significantly higher than those in the action/maintenance stage (16.91 ± 5.87). Extraversion for preparers (29.55 ± 5.68) was significantly higher than contemplators (25.44 ± 6.23). For post treatment, the multivariate analysis of variance resulted in another significant Wilk's λ of 0.77 ($F(5,170)=3.11$; $p < 0.01$). Univariate F-tests showed significant differences again between Neuroticism, Extraversion, and Conscientiousness. Tukey post hoc analysis showed that Neuroticism was significantly lower in the action/maintenance stage (17.51 ± 7.31) than both contemplators (23.49 ± 7.63) and preparers (21.26 ± 8.34). Action/maintainers were significantly higher for Extraversion (30.58 ± 5.91) and Conscientiousness (37.56 ± 5.80) than those in the contemplation (E= 25.37 ± 7.02 ; C= 33.48 ± 6.43) and preparation stages (N= 21.26 ± 8.34 ; C= 33.55 ± 5.38). The findings of this study indicate that personality discriminates levels of exercise motivation and behavior during and following breast cancer treatment. Personality may be an important determinant of exercise following breast cancer diagnosis (Rhodes, Courneya, & Bobick, 2001). This study specifically targets breast cancer survivors. However,

similar relationships between personality and exercise motivation may be present in the general population.

One study aimed to review the available evidence for a relationship between personality and physical activity in the general population by combining literature on major personality traits. Thirty-seven years of studies were summarized by meta-analysis and the findings state that Extraversion, Neuroticism, and Conscientiousness are correlates of physical activity. From the studies on Neuroticism, the summary r was -0.11 , with an observed variance of 0.002 and a sampling error of 0 . This suggests that Neuroticism is a correlate of physical activity with a small effect size (Rhodes & Smith, 2006). With Extraversion, the summary r was 0.2 , with an observed variance of 0.006 and a sampling error of 0 . These results suggest that Extraversion is a correlate of physical activity with a small-medium effect (Rhodes & Smith, 2006). Conscientiousness had a summary statistic of $r = 0.20$, with a variance of 0.005 . These findings support a small relationship between Conscientiousness and physical activity (Rhodes & Smith, 2006). No relationship was found between physical activity and the other two personality types, Openness and Agreeableness. It was also stated that studies examining personality and different physical activity modes suggested differences by traits but not enough research has been done to make final conclusions (Rhodes & Smith, 2006).

Because studies were done about a correlation between personality types and which individuals would be physically active, further research was conducted to detect an association between personality and how physically active individuals are. A study by Wilson, Das, Evans, and Dishman (2015) aimed to test direct, indirect, and interactive relations between Extraversion, Neuroticism, behavioral inhibition system (BIS), and behavioral activation system (BAS), and physical activity measured by self-report and accelerometry. Extraversion was related to self-

reported physical activity (correlation of 0.222, $p < 0.001$), whereas Neuroticism was related to physical activity measured by an accelerometer (correlation of -0.269, $p < 0.001$). The associations of physical activity with Extraversion, Neuroticism, and BAS (behavioral approach system: offers trait descriptions that are reflective of reinforcement history) represent a binomial difference of approximately 10%-30% in self-reported physical activity and 25% in objectively measured physical activity between low and high personality scores in a normal distribution and this indicates that personality influences physical activity in as many as 1-3 people of 10 in the population. The results of this study suggest that the relationship between physical activity and personality depended on how physical activity is measured (Wilson et al., 2015). This suggests that further research should look into the amounts of physical activity in individuals using only one measure of physical activity to discover differences between personality types. The absence of any association with personality and routine physical activity could suggest that personality cannot be used to predict if someone is routinely active. A further break down of types of physical activity could result in higher associations with each personality domain.

Conclusion

Being physically active results in a substantial amount of benefits for health. Even so, a majority of people remain inactive. Physical activity interventions and referral schemes have sought to combat this sedentary behavior but have failed to do so cost effectively and long-term. In order for interventions to be effective, they must take into consideration the different factors that affect adherence. Personality, in particular, is responsible for many innate behaviors and preferences. For this reason, the studies looking to relate physical activity with personality were created. Extraversion, Neuroticism, and Conscientiousness were found to be correlates of

physical activity. It was also found that individuals with higher Neuroticism or Extraversion or lower Conscientiousness have a higher BMI and that high Neuroticism and low Conscientiousness are associated with greater weight fluctuations over time. The personality factor, Neuroticism, was also found to be related to effective weight loss with dietary compliance and enhanced satiety. Further studies have stated that the relationship between physical activity and personality depends on how physical activity is measured but also that personality influences physical activity in as many as 1-3 people out of 10 in the population. Because individuals adhere to different activities based on their personal preferences, it could be difficult to determine which personality factor would produce more physically active people if the individuals in question have yet to participate in an activity that is appealing to their personality. If it is known that personality could be influencing activity, the overarching question should ask how each personality factor best adheres to physical activity. By determining the physical activity preferences and adherence data of each personality factor, there would be new understanding on the contributions of personality to physical activity. This information would then enhance activity interventions and then hopefully affect the sedentary individuals in the population. This type of information could have a vast impact on public health because personality could be used to match individuals with activities they are most likely to enjoy and adhere to and therefore eliminate some of the attrition and adherence problems most people see with physical activity today.

Table 2- Personality Correlations

Openness	Conscientiousnes	Extraversion	Agreeableness	Neuroticism
<ul style="list-style-type: none"> • + fruit consumption • +vegetable consumption 	<ul style="list-style-type: none"> • - BMI • - weight fluctuations • -physical activity 	<ul style="list-style-type: none"> • + BMI • + body appreciation • + sports related physical activity • + physical activity • + preparation stag (stages of change) 	<ul style="list-style-type: none"> • + vegetable consumption 	<ul style="list-style-type: none"> • + BMI • - weight fluctuations • + body dissatisfaction • + weight loss (very low energy diet) • - muscle stregnth (women) • + contemplation stage (Stages of change)

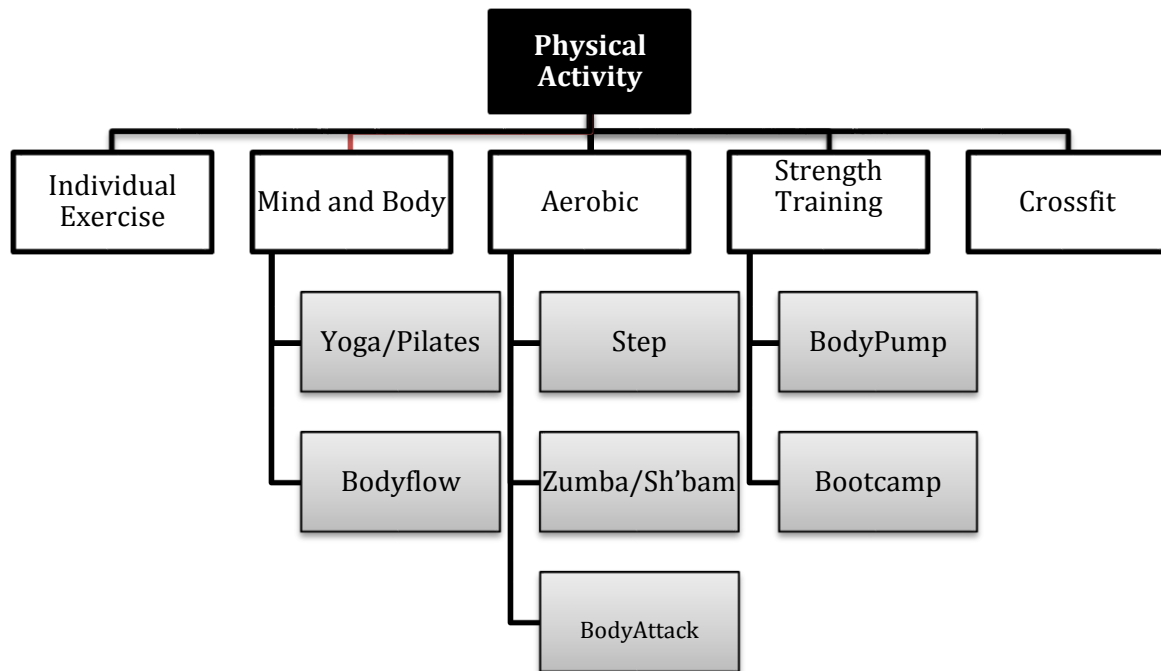
*There are many correlates to personality, but the ones listed above relate most to the study in question.

Chapter 3: Methods

Participants

All participants were recruited from local fitness facilities in Greenville, North Carolina. Eligible participants were women between the ages of 30 and 50 years. This age range was set in order to ensure solidified personality types. Participants were recruited by word of mouth and locations of recruitment were based around five different modes of exercise. These five modes included aerobic classes, Crossfit, mind and body classes, strength training classes, and individuals who prefer to exercise alone. All procedures were approved by the University Institutional Review Board. Informed consent was electronically signed by each participant.

Figure 1: Allocation of Participants



Measures

All participants had self-reported measurements taken on demographics, personality, leisure physical activity, and physical activity enjoyment. These measurements were taken using online questionnaires via Qualtrics. Full completion of all questions was ensured before the data was included in the analysis.

Demographics. A demographic questionnaire was completed in order to measure participant characteristics. Measures such as age, race, household size, education, and income were assessed. Individuals were also asked what their preferred type of physical activity is and what type of activity they do most often.

Personality. Personality was measured using the International Personality Item Pool (IPIP; Goldberg et al. 1999), using a 1-5 Likert-type response format. The 50-item version of this questionnaire was administered for this measure. Participants were asked to rate how they feel about a certain statement such as, “I am the life of the party,” I feel comfortable around people,” and “ I am not interested in other people’s problems.” The response options included 1 = very accurate, 2 = moderately accurate, 3 =neither accurate nor inaccurate, 4 = moderately inaccurate, and 5 = very inaccurate. The responses for each question were then used to calculate a total score for each personality domain. The scores were calculated with the equations given with the questionnaire. Scores were out of a total possible score of 40 points and the higher an individual scores, the more an individual fits that particular domain of personality. Research has provided evidence of reliability (Goldberg, 1999) between the IPIP and other forms of personality assessment including the NEO-PI-R ($r = 0.94$), 16PF ($r = 0.86$), and the CPI ($r = .84$).

Physical Activity Enjoyment. Physical Activity enjoyment was assessed using the Exercise Enjoyment Scale (Kendzierski & DeCarlo, 1991). Participants were asked to rate how

they felt about physical activity based on two choices each time (e.g., “I enjoy it; I hate it,” “I feel bored; I feel interested”). The 18 questions use a 7-point bipolar scale that includes like and dislike, enjoy and hate, boring and interesting, pleasurable and unpleasurable, and fun and not fun. Based on each response, an average enjoyment score was calculated for each participant. If the participant chose the positive response towards exercise, they were given a score of 7. If the participant chose the negative response towards exercise, they were given a score of 1. These scores were then averaged to find a total enjoyment level between 1 (low enjoyment) and 7 (high enjoyment) for each participant. Research has provided evidence for reliability of the PACES questionnaire as a measure of enjoyment. The PACES questionnaire has shown an internal consistency of 0.93 as assessed by Chronbach’s (1951) coefficient alpha (Kendzierski & DeCarlo, 1991).

Leisure-Time Physical Activity. The amount of leisure-time physical activity was measured using the Godin Leisure-Time Physical Activity Questionnaire (Godin, 1985). Individuals were asked to complete a self-explanatory, brief four-item query of usual leisure-time exercise habits. Questions asked: “During a typical 7-Day period, how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time? (e.g, Strenuous Exercise, Moderate Exercise, Mild Exercise).” Their responses were then used to calculate the time spent doing leisure physical activity each week using the following equation: Weekly leisure activity score = $(9 \times \text{Strenuous}) + (5 \times \text{Moderate}) + (3 \times \text{Light})$. Participants were then ranked based on the cumulative amount of exercise per week. Research has offered sufficient evidence of reliability and validity of the Godin Leisure-Time physical activity Questionnaire (Godin & Shephard, 1985). In a study of 53 healthy adults, the Godin Leisure-Time Questionnaire offered a correlation value of 0.74 for test and retest values.

Similarly, a study of 163 men and 143 women between the ages of 18 and 65 were correctly classified by the questionnaire when compared to VO₂max (69%) and body fat % (66%).

Procedures

Participants were recruited from multiple locations around the Greenville area. At the time of recruitment, participants received the informed consent document and answered two screening questions using a Qualtrics survey that asked for their sex and their age. Those who met the screening criteria then moved on to the questionnaires. Participants completed the demographic questionnaire, the personality questionnaire (IPIP), the Physical Activity Enjoyment questionnaire (PACES), and the leisure-time physical activity questionnaire (Godin). To prevent researcher bias, participants were afforded privacy during completion of the questionnaires. All screening questions and questionnaires were administered with the use of an iPad.

Statistical Analysis

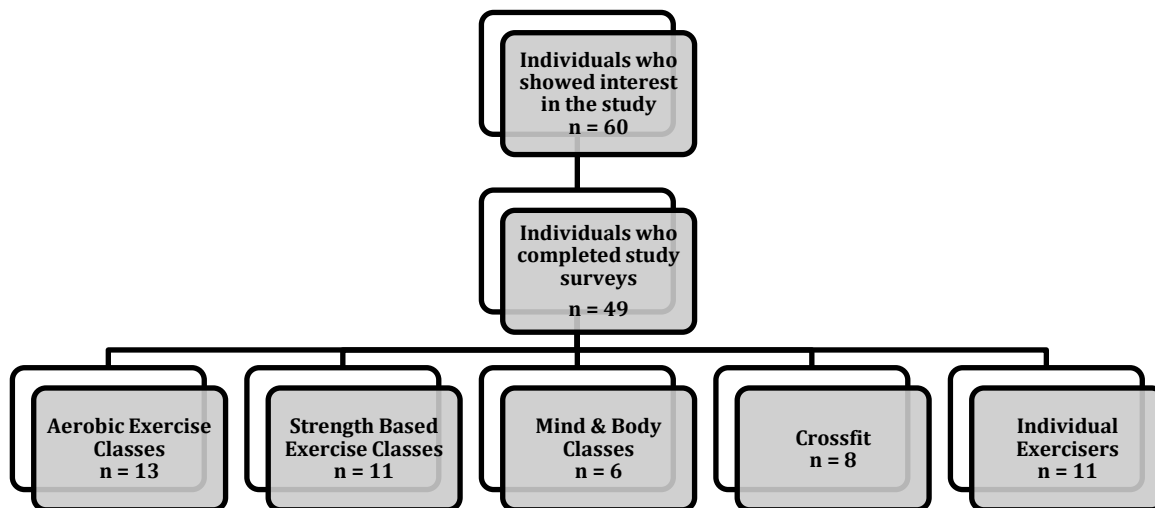
Descriptive statistics were calculated to summarize participant characteristics. Multiple analyses were used to compare the collected data. A chi-square was used to test the relationship between personality and preferred exercise, two categorical variables. An ANOVA was also used to compare the mean scores of each personality facet with preferred exercise. An ANOVA was used to test the relationship between personality and leisure physical activity and personality and physical activity enjoyment. All significant tests were conducted at a nominal value of $p = .05$.

Chapter 4: Results

Recruitment and Flow of Participants

Sixty individuals showed interest in this study. Forty-nine individuals completed the surveys for this study. The remaining 11 did not complete the personality questionnaire in its entirety for this study and were therefore excluded from data analysis. Of the 49 participants, 13 individuals preferred aerobic exercise classes, 11 individuals preferred strength-based exercise classes, 6 preferred mind and body classes, 8 preferred Crossfit, and 11 preferred to exercise individually.

Figure 2- Participant Distributions



Participant Characteristics

All participants were female between the ages of 31 and 50 years. The majority of participants were Caucasian ($n = 38, 77.6\%$). The remaining participants identified as African American ($n = 9, 18.4\%$), Native American or other Pacific Islander ($n = 1, 2.0\%$), and American Indian or Alaskan Native ($n = 1, 2.0\%$). One participant reported being Hispanic or Latino

Table 4
Participant Demographics 2

		Total	Aerobic	Strength	Mind & Body	Crossfit	Individual
Individual Annual Income	\$15,000- \$24,999	5 (10.2%)	1 (7.7%)	1 (9.1%)	0 (0.0%)	0 (0.0%)	3 (27.3%)
	\$25,000- \$34,999	2 (4.1%)	1 (7.7%)	1 (9.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	35,000- \$49,999	10 (20.4%)	3 (23.1%)	4 (36.4%)	0 (0.0%)	1 (12.5%)	2 (18.3%)
	\$50,000- \$74,999	19 (38.8%)	6 (46.2%)	4 (36.4%)	4 (66.7%)	2 (25.0%)	3 (27.3%)
	\$75,000- \$99,999	7 (14.3%)	2 (15.0%)	1 (9.1%)	0 (0.0%)	2 (25.0%)	2 (18.2%)
Household Annual Income	\$15,000- \$24,999	1 (2.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (9.1%)
	\$25,000- \$34,999	1 (2.0%)	1 (15.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	35,000- \$49,999	6 (12.2%)	2 (15.4%)	3 (27.3%)	0 (0.0%)	1 (12.5%)	0 (0.0%)
	\$50,000- \$74,999	11 (22.4%)	3 (23.1%)	2 (18.2%)	2 (33.3%)	1 (12.5%)	3 (27.3%)
	\$75,000- \$99,999	8 (16.3%)	3 (23.1%)	2 (18.2%)	0 (0.0%)	0 (0.0%)	3 (27.3%)
Education Level	High school, some college	5 (10.2%)	1 (7.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	4 (36.4%)
	Completed Undergrad Degree	16 (32.7%)	4 (30.8%)	5 (45.5%)	2 (33.3%)	3 (37.5%)	2 (18.2%)
	Completed undergrad, some graduate work	3 (6.1%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	1 (12.5%)	0 (0.0%)
	Completed Graduate school	11 (22.4%)	5 (38.5%)	5 (45.5%)	0 (0.0%)	1 (12.5%)	1 (9.1%)
	Professional/ Doctorate level education	13 (26.5%)	3 (23.1%)	1 (9.1%)	2 (33.3%)	3 (37.5%)	4 (36.4%)
	Other	1 (2.0%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	0 (0.0%)	0 (0.0%)

Personality and Preferred Exercise

All individuals were categorized into one of the five domains of personality according to their IPIP scores. Four individuals had equal scores in two different domains and therefore were considered as two separate scores during the analysis. This resulted in 2 extraverted individuals, 29 agreeable individuals, 16 conscientious individuals, 1 neurotic individual, and 6 open individuals. A chi-square was used to test for a relationship between individual's preferred mode of exercise and their personality type. Firstly, a chi-square test was run using all 5 modes of exercise separately (Tables 5 and 6). Individual personality types were significantly correlated with their preferred mode of exercise with a test value of 30.19 ($p = .02$). A second chi-square grouped all group exercise classes (Aerobic classes, Strength Training Classes, Mind & Body Classes) and compared them with Crossfit and individual exercisers (Tables 7 and 8). Personality was still significantly related to preferred mode of exercise with a value of 16.18 ($p = .04$) when all group classes were combined in the same category. Finally, a one-way ANOVA was performed to compare the mean scores for each personality facet. This test resulted in only one significant value ($p=.01$) for the personality domain conscientious (Tables 9 and 10).

Table 5
Individual Exercise*Personality Crosstabulation

			Personality Facet					Total
			A	C	E	N	O	
Exercise	Aerobic Classes	Count % within exercise	7 50.0%	4 28.6%	1 7.1%	0 0.0%	2 14.3%	14 100.0%
	Crossfit	Count % within exercise	0 0.0%	6 75.0%	0 0.0%	0 0.0%	2 25.0%	8 100.0%
	Individual Exercise	Count % within exercise	10 66.7%	1 6.7%	0 0.0%	0 0.0%	4 26.7%	15 100.0%
	Mind & Body Classes	Count % within exercise	3 50.0%	0 0.0%	1 16.7%	1 16.7%	1 16.7%	6 100.0%
	Strength Training Classes	Count % within exercise	7 58.3%	4 33.3%	0 0.0%	0 0.0%	1 8.3%	12 100.0%
Total		Count % within exercise	27 49.1%	15 27.3%	2 3.6%	1 1.8%	10 18.2%	55 100.0%

Table 6
Individual Exercise*Personality Chi-Square

	Sum of Squares	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.19 ^a	16	.02
Likelihood Ratio	30.67	16	.02
N of Valid Cases	55		

a. 22 cells (88.0%) have expected count less than 5. The minimum expected count is .11.

Table 7
Group Exercise*Personality Crosstabulation

			Personality Facet					Total
			A	C	E	N	O	
Exercise	Group Fitness Classes	Count % within exercise	17 54.8%	8 25.8%	2 6.5%	1 3.2%	3 9.7%	31 100.0%
	Crossfit	Count % within exercise	1 12.5%	6 75.0%	0 0.0%	0 0.0%	1 12.5%	8 100.0%
	Individual Exercise	Count % within exercise	10 66.7%	1 6.7%	0 0.0%	0 0.0%	4 26.7%	15 100.0%
Total		Count % within exercise	28 51.9%	15 27.8%	2 3.7%	1 1.9%	8 14.8%	54 100.0%

*The group fitness category here combines aerobic, mind & body, and strength based classes.

Table 8
Group Exercise*Personality Chi-Square

	Sum of Squares	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.18 ^a	8	.04
Likelihood Ratio	17.11	8	.03
N of Valid Cases	54		

a. 12 cells (80.0%) have expected count less than 5. The minimum expected count is .15.

Table 9
ANOVA- Preferred exercise*Personality Descriptives

		N	Mean	Std. Deviation
Extraversion	Aerobic	14	21.36	6.79
	Crossfit	8	17.25	8.07
	Individual	15	24.00	6.07
	Mind & Body	6	26.67	7.31
	Strength	12	20.17	8.59
	Total	55	21.80	7.53
Agreeable	Aerobic	14	32.29	5.37
	Crossfit	8	27.75	6.09
	Individual	15	32.33	4.15
	Mind & Body	6	30.00	5.73
	Strength	12	31.00	3.38
	Total	55	31.11	4.92
Conscientious	Aerobic	14	30.21	8.01
	Crossfit	8	33.00	4.47
	Individual	15	26.93	4.32
	Mind & Body	6	21.67	7.39
	Strength	12	28.42	5.55
	Total	55	28.40	6.62
Neurotic	Aerobic	14	22.36	7.72
	Crossfit	8	21.38	6.37
	Individual	15	21.60	5.54
	Mind & Body	6	21.50	5.32
	Strength	12	20.67	5.66
	Total	55	21.55	6.09
Open	Aerobic	14	28.71	4.23
	Crossfit	8	26.50	7.03
	Individual	15	30.07	4.32
	Mind & Body	6	28.83	3.76
	Strength	12	25.50	5.58
	Total	55	28.07	5.13

Table 10
ANOVA- Preferred Exercise*Personality scores

		df	F	Sig.
Extraversion	Between Groups	4	1.96	.12
	Within Groups	50		
	Total	54		
Agreeable	Between Groups	4	1.50	.22
	Within Groups	50		
	Total	54		
Conscientious	Between Groups	4	3.52	.01
	Within Groups	50		
	Total	54		
Neurotic	Between Groups	4	.12	.98
	Within Groups	50		
	Total	54		
Open	Between Groups	4	1.68	.17
	Within Groups	50		
	Total	54		

Personality and Leisure-Time Physical Activity

The participants completed the Godin Leisure-Time Physical Activity questionnaire and their total leisure physical activity was calculated. Using the same classification of personality, a one-way ANOVA was used to test the relationship between personality and leisure physical activity. The descriptive statistics and results of this test can be seen in Table 11 and Table 12 respectively. The ANOVA did not result in a significant value (.06) for personality and leisure physical activity. A Pearson Correlation test was also used to test personality as a continuous variable instead of a categorical variable with leisure-time physical activity. This test also did not result in any significant values (Table 13).

Table 11
Personality*Leisure PA ANOVA Descriptive Statistics

	N	Mean	Std. Deviation
A	28	47.93	20.55
C	15	65.53	19.55
E	2	43.00	5.66
N	1	27.00	21.97
O	9	55.44	21.36
Total	55	53.40	20.32

Table 12
Personality*Leisure PA ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3997.39	4	999.35	2.42	.06
Within Groups	20647.81	50	412.96		
Total	24645.20	54			

Table 13
Pearson Correlation- Personality*Leisure PA

		Extraversion	Agreeable	Conscientious	Neurotic	Open
Leisure	Pearson Correlation	-.17	-.10	.17	-.07	-.01
PA	Sig. (2-tailed)	.21	.47	.21	.60	.94

Personality and Physical Activity Enjoyment

Participants completed the 18-item version of the Physical Activity Enjoyment Scale. The total enjoyment score for each participant was then calculated. Using the same personality classification again, a one-way ANOVA was used to test the relationship between personality

and physical activity enjoyment. The descriptive statistics and results of this test can be seen in Table 14 and Table 15 respectively. This test did not result in a significant value ($p = .85$) and suggests that personality may not be related to an individual's enjoyment of physical activity. A Pearson Correlation was also used to test the relationship between physical activity enjoyment and personality as a continuous variable. Only the domain conscientious exhibited a significant relationship ($r = -.33, p = .02$). These values can be seen in Table 16.

Table 14
Personality*PA Enjoyment ANOVA Descriptive Statistics

	N	Mean	Std. Deviation
A	25	6.52	1.42
C	15	6.66	0.47
E	2	6.50	0.24
N	1	7.00	.
O	7	6.09	1.24
Total	50	6.51	1.13

Table 15
Personality*PA Enjoyment ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.84	4	0.46	0.34	.85
Within Groups	61.06	45	1.36		
Total	62.90	49			

Table 16
Pearson Correlation- Personality*PA Enjoyment

		Extraversion	Agreeable	Conscientious	Neurotic	Open
PA	Pearson Correlation	.00	-.09	-.03	-.08	-.33*
Enjoyment	Sig. (2-tailed)	.99	.52	.86	.60	.02

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

Chapter 5: Discussion

Physical inactivity is one of the most significant public health problems of the 21st century (Blair, 2009). Determining the causes of this problem, and even more importantly, examining the best way to combat this problem will move our society toward a healthier future. One way to do this is to delineate a more efficient way to prescribe physical activity. Today, physical activity referral schemes have a small effect on increasing physical activity in sedentary individuals (Williams et al., 2007). Physical activity adherence factors should be used to create a method of prescription that will alleviate barriers to being active. These adherence factors have been researched to help explain why individuals are or are not active and to relate these factors to individuals, personality has been coupled seek a relationship that can be utilized to target them. Considering that personality types have been found to be related to many aspects of human behaviors and that the characteristics of each dimension can explain why each one is related to certain behaviors (Gerlach et al., 2015), personality may hold key to unveiling the link between individuals and physical activity adherence. With this is mind, the purpose of this study was to examine the relationship between the five factor model of personality and preferred physical activity, leisure physical activity, and physical activity enjoyment.

Personality

The purposes of this study were to examine the relationships between personality and preferred exercise type, leisure physical activity, and physical activity enjoyment. When using the IPIP, participants receive a total score out of 40 for each personality facet. The facet with the highest sum of scores classifies the individual as a particular personality type. Each of the Big Five personality domains were represented in this study with at least 1 participant in each

category. The total participants per facet were 2 extraverted individuals, 29 agreeable individuals, 16 conscientious individuals, 1 neurotic individual, and 6 open individuals.

Personality and Preferred Exercise

The first purpose of this study was to examine the relationship between personality and preferred exercise type among women ages 30 to 50 years. Participants were asked to choose their preferred mode of exercise from a given list of exercise modes during data collection. From the survey, it was determined that 15 individuals preferred aerobic exercise classes, 11 individuals preferred strength based exercise classes, 6 preferred mind and body classes, 8 preferred crossfit, and 11 preferred to exercise individually.

The two chi-square tests run between personality and preferred exercise did result in significant values. This is the first research to study and find significant relations between these two factors. These values further our understanding of how exercise tendencies are effected by factors like personality and exercise environments. This leads us to think that exercise prescription should be based more on these two factors to ensure a more specific prescription.

When furthering the statistical analysis through an ANOVA, only the conscientious domain exhibited a significant relationship. Participants in the aerobic and crossfit categories had the highest values for their levels of conscientiousness with scores of 30.21 and 33.00 respectively. This may suggest that conscientious individuals prefer higher intensity exercise modes over the other modes of exercise. This idea is also furthered with the fact that participants in the mind and body category scored lowest on the conscientious scale with a value of 21.67. For extraversion, participants in the mind and body category scored highest with a value of 26.67 and participants in the crossfit category scored lowest with a value of 17.25. In regard to agreeableness, aerobic and individual exercises scored similarly high with values of 32.29 and

32.22 respectively, while crossfit participants scored lowest with a value of 27.75. For the neurotic scale, all categories had very similar values with the highest being 22.36 for aerobic participants and the lowest being 20.67 for strength class participants. Finally, individual exercisers scored highest for the open scale with a score of 30.07 and strength class participants scored lowest with a value of 25.50. While these last four domains of personality did not offer significant values, the domains in which each category of exercise offered the highest scores could be used to create recommended modes of exercise based on one's personality type. A larger sample size could solidify these relationships for a stronger way to prescribe each exercise. Previous studies have not researched the relationship between an individual's personality scores and their preferred exercise, however, results of this study are similar to that of previous research in the fact that only 1 or 2 domains of personality have exhibited significant relationships.

Personality and Leisure Physical Activity

This study also sought to test the relationship between an individual's personality and their amount of leisure physical activity. The one-way ANOVA used to compare the mean amounts of leisure-time physical activity did not result in a significant value ($p=.06$) suggesting that there were no differences between leisure physical activity based on personality type. This value is approaching a significant level however and a larger sample size may significantly strengthen this relationship. The Pearson correlation that was used to test the correlation between personality scores and the amount of leisure-time physical activity also did not result in significant values.

These results suggest that with further research, significant differences could be found between personality types and an individual's amount of time spent doing leisure physical

activity. These differences would create an understanding of which people are more likely to be physically active in their free time. It would also allow those individuals that are likely to be less physically active to be targeted in terms of increasing physical activity. Previous research by Wilson et al. (2015) also studied the relationship between physical activity and personality. This study did not, however, research leisure-time physical activity specifically. Neither the current study nor Wilson's (2015) study found a significant relationship between personality and whether or not individuals were routinely active whether it was for exercise purposes or just leisure activity (Wilson et al., 2015). The absence of any association with personality and routine physical activity could suggest that personality cannot be used to predict if someone is routinely active.

Personality and Physical Activity Enjoyment

The one-way ANOVA used to compare the means of each personality domain's physical activity enjoyment score did not result in a significant value ($p=.85$). This suggests that physical activity enjoyment is not reliant on an individual's personality. However, the Pearson correlation test comparing the scores of each personality with the level of enjoyment did have a significant value for the conscientious domain of personality. This value suggests a weak negative relationship with the amount of physical activity enjoyment for conscientious individuals which means that individuals high on the conscientious scale are less likely to enjoy being physical active and it may be harder for these individuals to adhere to a physical activity program. The fact that only one domain had a significant relationship may also suggest that the barrier of not enjoying physical activity cannot be thoroughly targeted through personality testing. Previous research has yet to study the relationship between personality and individual physical activity enjoyment. All past research has looked at personality and behaviors and not necessarily an

individual's perception of enjoyment during that behavior (Raynor et al., 2009; Paunonen, 2003). Further research would be needed to understand what contributes to an individual's level of physical activity enjoyment in order to prescribe physical activity in a more effective manner.

Strengths, Limitations, and Future Research

One strength of this study is that it controlled for changes in personality based on age. Only including participants from a certain age range ensures that personality types are solidified at the time of data collection. Another strength of this study is that participants were only included in the analysis if they could choose one type of exercise for the preferred mode. Allowing participants to choose multiple modes of exercise would have made it difficult to find a significant relationship with personality. A further strength of this study is that it includes participants from a wide range of socioeconomic statuses (\$15,000 per year- greater than \$100,000 per year). This strengthens the applicability of the results to other populations.

This study had several limitations. First, this was an exploratory study and is limited by the small sample size. Larger sample sizes would have increased the statistical power of the findings and instilled a better understanding of the role of personality with exercise. This study is also limited by the fact that only women were included in this study and that a majority of these women were white (77.6%). It cannot be certain that the findings can be transferred to other populations. Of the total participants, only one was categorized into the neurotic category which limits the understanding of the relationships in question. Another limitation stems from the fact that all data was collected through self-report measures. The data is limited by the participants' abilities to answer each question truthfully.

Because this was an exploratory study, future research should look into expanding these findings. A larger sample size would strengthen relationships and should give definitive

correlations about specific exercise preferences. From this point, interventions can be created to test the adherence of inactive individuals to an exercise prescription based on their personality type. Future research should also include men and women of different ages to test the applicability of these findings to all populations.

Public Health Implications

The results of this study suggest an association between personality and preferred exercise mode in women between the ages of 30 and 50 years. Knowing that most individuals will quit within 6 months of beginning an exercise program (Carmody, Senner, Malinow, & Matarazzo, 1980), it is easy to see that exercise prescription methods need a more effective way of being created. The findings of this study propose the idea that exercise prescription can be based on an individual's personality. This knowledge can be used in many facilities; from a physician prescribing physical activity to their patient, to a gym offering personalized exercise prescriptions to its members. Individuals in a health coaching or patient education setting could benefit immensely from this kind of relationship. These professionals can use the relationships between physical activity and exercise to offer specific training/education for their patients that may struggle to find a mode of exercise that they can continue with. This type of training/education should be treated similar to vaccinations for a disease. Specialized exercise prescription/education for all individuals in need would eventually reduce the overall abundance of physical inactivity in the United States and hopefully also impact the prevalence of obesity and other diseases related to physical inactivity.

Conclusions

This study suggests that personality can be used to more effectively prescribe physical activity. Due to the fact that a majority of the United States does not meet physical activity

recommendations and that a majority of people quit exercise programs within 6 months of starting, it is imperative that a shift in this trend happens soon in order to combat the negative affects of not being physically active. Ultimately, personality should be used to provide individuals with exercise options that they are going to enjoy and adhere to. This relationship could improve the overall well-being of our population.

References

- Ainsworth, B. E., Haskell, W. L., Leon, A. S., Jacobs, D. R., Montoye, H. J., Sallis, J. F., & Paffenbarger, R. S. (1993). Compendium of physical activities: Classification of energy costs of human physical activities. *Medicine and Science in Sports and Exercise*, *25*(1), 71–80. <https://doi.org/10.1249/00005768-199301000-00011>
- Anokye, N. K., Trueman, P., Green, C., Pavey, T. G., Hillsdon, M., & Taylor, R. S. (2011). The cost-effectiveness of exercise referral schemes. *BMC Public Health*, *11*, 954. <https://doi.org/10.1186/1471-2458-11-954>
- Arikawa, A. Y., O'Dougherty, M., Kaufman, B. C., Schmitz, K. H., & Kurzer, M. S. (2012). Attrition and Adherence of Young Women to Aerobic Exercise: Lessons from the WISER study. *Contemporary Clinical Trials*, *33*(2), 298–301. <https://doi.org/10.1016/j.cct.2011.11.017>
- Blair, S. N. (2009). Physical inactivity: the biggest public health problem of the 21st century. *British Journal of Sports Medicine*, *43*(1), 1–2.
- Bouchard, T. J., & Loehlin, J. C. (2001). Genes, evolution, and personality. *Behavior Genetics*, *31*(3), 243–273.
- Bruijn, G.-J. de, Kremers, S. P. J., Mechelen, W. van, & Brug, J. (2005). Is personality related to fruit and vegetable intake and physical activity in adolescents? *Health Education Research*, *20*(6), 635–644. <https://doi.org/10.1093/her/cyh025>
- Carlson, S. A., Fulton, J. E., Pratt, M., Yang, Z., & Adams, E. K. (2015). Inadequate Physical Activity and Health Care Expenditures in the United States. *Progress in Cardiovascular Diseases*, *57*(4), 315–323. <https://doi.org/10.1016/j.pcad.2014.08.002>

- Carmody, T. P., Senner, J. W., Malinow, M. R., & Matarazzo, J. D. (1980). Physical exercise rehabilitation: long-term dropout rate in cardiac patients. *Journal of Behavioral Medicine*, 3(2), 163–168.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126–131.
- Davis, C., Shuster, B., Blackmore, E., & Fox, J. (2004). Looking good? family focus on appearance and the risk for eating disorders. *International Journal of Eating Disorders*, 35(2), 136–144. <https://doi.org/10.1002/eat.10250>
- Dionne, M. M., & Davis, C. (2004). Body image variability: the influence of body-composition information and neuroticism on young women's body dissatisfaction. *Body Image*, 1(4), 335–349. <https://doi.org/10.1016/j.bodyim.2004.10.003>
- Dishman, R. K. (1981). Biologic influences on exercise adherence. *Research Quarterly for Exercise and Sport*, 52(2), 143–159. <https://doi.org/10.1080/02701367.1981.10607852>
- Franklin, B. A., Brinks, J., & Sternburgh, L. (2010). Move More, Sit Less: A First-Line, Public Health Preventive Strategy? *Preventive Cardiology*, 13(4), 203–208. <https://doi.org/10.1111/j.1751-7141.2010.00075.x>
- Gale, J. B., Eckhoff, W. T., Mogel, S. ., & Rodnick, J. E. (1984, December 16). Factors related to adherence to an exercise program for heal... : *Medicine & Science in Sports & Exercise*. Retrieved February 7, 2016, from http://journals.lww.com/acsm-msse/Fulltext/1984/12000/Factors_related_to_adherence_to_an_exercise.4.aspx
- Gerlach, G., Herpertz, S., & Loeber, S. (2015). Personality traits and obesity: a systematic review. *Obesity Reviews*, 16(1), 32–63. <https://doi.org/10.1111/obr.12235>

- Gurven, M., von Rueden, C., Massenkoff, M., Kaplan, H., & Vie, M. L. (2013). How Universal Is the Big Five? Testing the Five-Factor Model of Personality Variation Among Forager–Farmers in the Bolivian Amazon. *Journal of Personality and Social Psychology, 104*(2), 354–370. <https://doi.org/10.1037/a0030841>
- Herring, M. P., Sailors, M. H., & Bray, M. S. (2014). Genetic factors in exercise adoption, adherence and obesity. *Obesity Reviews, 15*(1), 29–39. <https://doi.org/10.1111/obr.12089>
- Jorm, A., Christensen, H., Henderson, S., Korten, A., Mackinnon, A., & Scott, R. (1993). Neuroticism and self-reported health in an elderly community sample. *Personality and Individual Differences.*
- Kakizaki, M., Kuriyama, S., Sato, Y., Shimazu, T., Matsuda-Ohmori, K., Nakaya, N., ... Tsuji, I. (2008). Personality and body mass index: A cross-sectional analysis from the Miyagi Cohort Study. *Journal of Psychosomatic Research, 64*(1), 71–80. <https://doi.org/10.1016/j.jpsychores.2007.07.008>
- Kraus, W. E., Bittner, V., Appel, L., Blair, S. N., Church, T., Després, J.-P., ... Whitsel, L. (2015). The National Physical Activity Plan: A Call to Action From the American Heart Association A Science Advisory From the American Heart Association. *Circulation, 131*(21), 1932–1940. <https://doi.org/10.1161/CIR.0000000000000203>
- Lacharité-Lemieux, M., Brunelle, J.-P., & Dionne, I. J. (2015). Adherence to exercise and affective responses: comparison between outdoor and indoor training. *Menopause (New York, N.Y.), 22*(7), 731–740. <https://doi.org/10.1097/GME.0000000000000366>
- Lewis, B. A., Williams, D. M., Frayeh, A. L., & Marcus, B. H. (2016). Self-Efficacy versus Perceived Enjoyment as Predictors of Physical Activity Behavior. *Psychology & Health, 31*(4), 456–469. <https://doi.org/10.1080/08870446.2015.1111372>

- McCrae, R. R., & Allik, I. (2002). *The Five-Factor Model of Personality Across Cultures*. Springer Science & Business Media.
- McCrae, R. R., & John, O. P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, *60*(2), 175–215.
- Munro, I. A., Bore, M. R., Munro, D., & Garg, M. L. (2011). Using personality as a predictor of diet induced weight loss and weight management. *The International Journal of Behavioral Nutrition and Physical Activity*, *8*, 129. <https://doi.org/10.1186/1479-5868-8-129>
- Ozer, D. J., & Benet-Martínez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology*, *57*, 401–421. <https://doi.org/10.1146/annurev.psych.57.102904.190127>
- Paunonen, S. V. (2003). Big Five factors of personality and replicated predictions of behavior. *Journal of Personality and Social Psychology*, *84*(2), 411–424. <https://doi.org/10.1037/0022-3514.84.2.411>
- Pavey, T. G., Anokye, N., Taylor, A. H., Trueman, P., Moxham, T., Fox, K. R., ... Taylor, R. S. (2011). The clinical effectiveness and cost-effectiveness of exercise referral schemes: a systematic review and economic evaluation. *Health Technology Assessment (Winchester, England)*, *15*(44), i–xii, 1–254. <https://doi.org/10.3310/hta15440>
- Press, O. U. (2009). Part a: Executive Summary. *Nutrition Reviews*, *67*(2), 114–120. <https://doi.org/10.1111/j.1753-4887.2008.00136.x>
- Quah, S., & Cockerman, W. (2016). *International Encyclopedia of Public Health*. Academic Press.

- Rantanen, J., MetsäPelto, R.-L., Feldt, T., Pulkkinen, L., & Kokko, K. (2007). Long-term stability in the Big Five personality traits in adulthood. *Scandinavian Journal of Psychology*, *48*(6), 511–518. <https://doi.org/10.1111/j.1467-9450.2007.00609.x>
- Raynor, D. A., & Levine, H. (2009). Associations between the five-factor model of personality and health behaviors among college students. *Journal of American College Health: J of ACH*, *58*(1), 73–81. <https://doi.org/10.3200/JACH.58.1.73-82>
- Rhodes, R. E., Courneya, K. S., & Bobick, T. M. (2001). Personality and exercise participation across the breast cancer experience. *Psycho-Oncology*, *10*(5), 380–388. <https://doi.org/10.1002/pon.516>
- Rhodes, & Smith. (2006). Personality correlates of physical activity: a review and meta-analysis. *British Journal of Sports Medicine*, *40*(12), 958–965. <https://doi.org/10.1136/bjism.2006.028860>
- Ryan, null, & Deci, null. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, *25*(1), 54–67. <https://doi.org/10.1006/ceps.1999.1020>
- Seefeldt, V., Malina, R. M., & Clark, M. A. (2012). Factors Affecting Levels of Physical Activity in Adults. *Sports Medicine*, *32*(3), 143–168. <https://doi.org/10.2165/00007256-200232030-00001>
- Sutin, A. R. (2013). Optimism, pessimism, and bias in self-reported body weight among older adults. *Obesity (Silver Spring, Md.)*, *21*(9), E508–E511. <https://doi.org/10.1002/oby.20447>

- Sutin, A. R., Ferrucci, L., Zonderman, A. B., & Terracciano, A. (2011). Personality and Obesity across the Adult Lifespan. *Journal of Personality and Social Psychology, 101*(3), 579–592. <https://doi.org/10.1037/a0024286>
- Swami, V., Tran, U. S., Brooks, L. H., Kanaan, L., Luesse, E.-M., Nader, I. W., ... Voracek, M. (2013). Body image and personality: Associations between the Big Five Personality Factors, actual-ideal weight discrepancy, and body appreciation: *Body Image and Personality. Scandinavian Journal of Psychology, 54*(2), 146–151. <https://doi.org/10.1111/sjop.12014>
- Tolea, M. I., Terracciano, A., Simonsick, E. M., Metter, E. J., Costa, P. T., & Ferrucci, L. (2012). Associations between personality traits, physical activity level, and muscle strength. *Journal of Research in Personality, 46*(3), 264–270. <https://doi.org/10.1016/j.jrp.2012.02.002>
- Watson, K., & Baar, K. (2014). mTOR and the health benefits of exercise. *Seminars in Cell & Developmental Biology, 36*, 130–139. <https://doi.org/10.1016/j.semcdb.2014.08.013>
- Weiss, A., King, J. E., & Figueredo, A. J. (2000). The heritability of personality factors in chimpanzees (*Pan troglodytes*). *Behavior Genetics, 30*(3), 213–221.
- Williams, N. H., Hendry, M., France, B., Lewis, R., & Wilkinson, C. (2007). Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review. *The British Journal of General Practice, 57*(545), 979–986.
- Wilson, K. E., Das, B. M., Evans, E. M., & Dishman, R. K. (2015). Personality Correlates of Physical Activity in College Women. *Medicine and Science in Sports and Exercise, 47*(8), 1691–1697. <https://doi.org/10.1249/MSS.0000000000000570>

APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building · Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** · www.ecu.edu/irb

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB
To: [Ralph Wofford](#)
CC: [Bhibha Das](#)
Date: 9/28/2016
Re: [UMCIRB 16-001031](#)
Personality and Physical Activity Type

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 9/27/2016 to 9/26/2017. The research study is eligible for review under expedited category # 7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Demographic Questionnaire	Surveys and Questionnaires
Godin Leisure-time Exercise Questionnaire	Surveys and Questionnaires
Informed Consent: No more than minimal risk	Consent Forms
IPIP Big 5 Questionnaire	Surveys and Questionnaires
Lifestyle HRSC	Surveys and Questionnaires
Physical Activity Enjoyment Scale	Surveys and Questionnaires
Thesis Proposal	Study Protocol or Grant Application

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B

INFORMED CONSENT



Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: The Five-Factor Model of Personality and Physical Activity Adherence

Principal Investigator: Jeremiah Wofford (Person in Charge of this Study)

Institution, Department or Division: Department of Kinesiology

Address: 172 Minges Coliseum

Telephone #: 252.328.0009

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?

The purpose of this research is to advance our knowledge on exercise adherence. This study will look for a relationship between exercise adherence and personality. You are being invited to take part in this research because you meet the qualifications and have exhibited adherence to a specific type of exercise. The decision to take part in this research is yours to make. By doing this research, we hope to learn whether or not certain personality types correlate with specific types of exercise adherence.

If you volunteer to take part in this research, you will be one of about 50 people to do so.

Are there reasons I should not take part in this research?

You should not participate in this research if you are not between the ages of 30 and 50 or are not female.

What other choices do I have if I do not take part in this research?

You can choose not to participate.

Where is the research going to take place and how long will it last?

The research will be conducted at the location in which the participant engages in the exercise in question. Participation in this research will only require 1 session for each participant. The total amount of time you will be asked to volunteer for this study is **30 minutes** over the 1 session.

What will I be asked to do?

You will be asked to complete five different questionnaires/surveys (online).

Here are the following questionnaires we will be using and why they are being used.

Questionnaire	Purpose
Demographic and Medical History	Collect your demographics and medical history
IPIP Big 5	Determine your personality
Physical Activity Enjoyment Scale	Measure your personal enjoyment of physical activity.
Godin Leisure-Time Exercise Questionnaire	Measures usual leisure-time exercise habits
Lifestyle Health-Related Self-Concept Questionnaire	Measures your self-perception of personal health attitudes and behaviors.

What might I experience if I take part in the research?

We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We don't know if you will benefit from taking part in this study. There may not be any personal benefit to you but the information gained by doing this research may help others in the future.

Will I be paid for taking part in this research?

We will not be able to pay you for the time you volunteer while being in this study. However, each participant will be entered in a drawing for one of three stability balls at the end of the study.

Will it cost me to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- The sponsors of this study.

- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records that identify you.

How will you keep the information you collect about me secure? How long will you keep it?

Information collected will be kept for 7 years in a locked filing cabinet in 172 Minges.

What if I decide I don't want to continue in this research?

You can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you normally receive.

Who should I contact if I have questions?

The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at 919.935.4954 (days, between 8am and 5pm).

If you have questions about your rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971.

I have decided I want to take part in this research. What should I do now?

Please read the following and if you agree, you should continue on to the following surveys:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By continuing past this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

APPENDIX C

QUESTIONNAIRES

1. Demographics and Medical History
2. Godin Leisure-Time Exercise Questionnaire
3. IPIP
4. Lifestyle Health-Related Self-Concept Questionnaire
5. Physical Activity Enjoyment Scale (PACES)

Demographics and Health History

Demographics																			
Date of Birth:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> <tr> <td style="font-size: 8px;">MM</td> <td style="font-size: 8px;">DD</td> <td colspan="4" style="font-size: 8px;">YYYY</td> <td colspan="2"></td> </tr> </table> Age: <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center; margin-left: 10px;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>									MM	DD	YYYY							
MM	DD	YYYY																	
Are you currently married?	<p>1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No</p> <p><i>If no, please specify:</i></p> <p>1 <input type="checkbox"/> Never married</p> <p>2 <input type="checkbox"/> Living with partner</p> <p>3 <input type="checkbox"/> Divorced/Separated</p> <p>4 <input type="checkbox"/> Widowed</p> <p>5 <input type="checkbox"/> Other _____</p>																		
What is your race? <i>(Please specify all categories that apply.)</i>	<p>1 <input type="checkbox"/> Asian</p> <p>2 <input type="checkbox"/> Black or African American</p> <p>3 <input type="checkbox"/> Native Hawaiian or Other Pacific Islander</p> <p>4 <input type="checkbox"/> American Indian or Alaskan Native</p> <p>5 <input type="checkbox"/> White</p> <p>6 <input type="checkbox"/> Other _____</p>																		
What is your ethnicity?	<p>1 <input type="checkbox"/> Hispanic or Latino</p> <p>2 <input type="checkbox"/> Not Hispanic or Latino</p>																		
What is your sex?	<p>1 <input type="checkbox"/> Male</p> <p>2 <input type="checkbox"/> Female</p>																		
What is your current employment status?	<p>1 <input type="checkbox"/> Full time – at least 35 hours/week at a paid job</p> <p>2 <input type="checkbox"/> Part time –less than 35 hours/week at a paid job</p> <p>3 <input type="checkbox"/> Other, <i>please specify:</i> _____</p>																		

Do you have any children?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No <hr/> <i>If yes, please specify how many:</i> <input type="text"/> <input type="text"/>
Please select the highest level of education completed by you.	1 <input type="checkbox"/> High school graduate/GED 2 <input type="checkbox"/> High school graduate, some college experience 3 <input type="checkbox"/> Completed undergraduate degree 4 <input type="checkbox"/> Completed undergraduate degree, some graduate coursework 5 <input type="checkbox"/> Completed graduate school 6 <input type="checkbox"/> Professional/doctoral level education 7 <input type="checkbox"/> Other, <i>please specify:</i> _____
What is your total gross household annual income (before taxes and deductions)	1 <input type="checkbox"/> \$0-\$14,999 2 <input type="checkbox"/> \$15,000-\$24,999 3 <input type="checkbox"/> \$25,000-\$34,999 4 <input type="checkbox"/> \$35,000-\$49,999 5 <input type="checkbox"/> \$50,000-74,9999 6 <input type="checkbox"/> \$75,000-99,999 7 <input type="checkbox"/> \$100,000 or greater 8 <input type="checkbox"/> I choose not to answer
What is your family's total gross household annual income (before taxes and deductions)	1 <input type="checkbox"/> \$0-\$14,999 2 <input type="checkbox"/> \$15,000-\$24,999 3 <input type="checkbox"/> \$25,000-\$34,999 4 <input type="checkbox"/> \$35,000-\$49,999 5 <input type="checkbox"/> \$50,000-74,9999 6 <input type="checkbox"/> \$75,000-99,999 7 <input type="checkbox"/> \$100,000 or greater 8 <input type="checkbox"/> I choose not to answer
How many children (under 18 years) live in your household?	_____ Children
How many children (under 5 years) live in your household?	_____ Children
How adult dependents (over 65 years) live in your household?	_____ Adults
Please describe your occupation.	1 <input type="checkbox"/> Management, professional and related 2 <input type="checkbox"/> Service 3 <input type="checkbox"/> Sales and office 4 <input type="checkbox"/> Farming, fishing, and forestry 5 <input type="checkbox"/> Construction, extraction, and maintenance 6 <input type="checkbox"/> Production, transportation, and material moving

Please describe your working class.	1 <input type="checkbox"/> Faculty 2 <input type="checkbox"/> Staff 3 <input type="checkbox"/> Civil Service 4 <input type="checkbox"/> Other, <i>please specify:</i> _____
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Health History

Do you have any of the following:

Have you been diagnosed with a past or present heart disease (e.g., high blood pressure, high cholesterol, heart attack, etc.)	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No
Have you ever been diagnosed with a lung disease such as COPD, asthma. Or sleep apnea?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No
Do you have arthritis?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No
Have you been diagnosed with any kind of cancer?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No
Do you have thyroid issues?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No

Have you ever used tobacco products?	1 <input type="checkbox"/> Yes 0 <input type="checkbox"/> No
If yes, How many years did you use it?	<input type="text"/> <input type="text"/> Years <hr style="width: 100%;"/>
What tobacco product do you use?	<input type="text"/> <input type="text"/> Years ago
If you quit using tobacco, how long ago did you quit?	<input type="text"/> <input type="text"/> Years ago

How many cans of beer do you have weekly?	<input type="text"/>	<input type="text"/>	cans of beer/week
How many glasses of wine do you have weekly?	<input type="text"/>	<input type="text"/>	glasses/week
How many ounces of liquor do you have weekly?	<input type="text"/>	<input type="text"/>	ounces/week
How many cigars or pipes do you smoke daily?	<input type="text"/>	<input type="text"/>	cigars or pipes/day
How often would you rate your stress level as high?	0 <input type="checkbox"/> Occasionally 1 <input type="checkbox"/> Frequently 2 <input type="checkbox"/> Constantly		
How would you rate your overall health status?	1 <input type="checkbox"/> Poor 2 <input type="checkbox"/> Bad 3 <input type="checkbox"/> Average 4 <input type="checkbox"/> Good 5 <input type="checkbox"/> Excellent		

Physical Activity	
Which type of physical activity to you prefer?	<input type="checkbox"/> Individual exercise <input type="checkbox"/> Mind and Body Classes (e.g. yoga, pilates, bodyflow, etc.) <input type="checkbox"/> Aerobic Classes (e.g. step, zumba, BodyAttack) <input type="checkbox"/> Strength Training Classes (e.g. Bodypump, Bootcamp) <input type="checkbox"/> Crossfit
Which type of physical activity do you participate in most often?	<input type="checkbox"/> Individual exercise <input type="checkbox"/> Mind and Body Classes (e.g. yoga, pilates, bodyflow, etc.) <input type="checkbox"/> Aerobic Classes (e.g. step, zumba, BodyAttack) <input type="checkbox"/> Strength Training Classes (e.g. Bodypump, Bootcamp) <input type="checkbox"/> Crossfit <input type="checkbox"/> I do not regularly exercise

Godin Leisure-Time Exercise Questionnaire

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

Times Per Week

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

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

OFTEN

1.

SOMETIMES

2.

NEVER/RARELY

3.

29.	Get upset easily.	0	0	0	0	0	(4-)
30.	Do not have a good imagination.	0	0	0	0	0	(5-)
31.	Talk to a lot of different people at parties.	0	0	0	0	0	(1+)
32.	Am not really interested in others.	0	0	0	0	0	(2-)
33.	Like order.	0	0	0	0	0	(3+)
34.	Change my mood a lot.	0	0	0	0	0	(4-)
35.	Am quick to understand things.	0	0	0	0	0	(5+)
36.	Don't like to draw attention to myself.	0	0	0	0	0	(1-)
37.	Take time out for others.	0	0	0	0	0	(2+)
38.	Shirk my duties.	0	0	0	0	0	(3-)
39.	Have frequent mood swings.	0	0	0	0	0	(4-)
40.	Use difficult words.	0	0	0	0	0	(5+)
41.	Don't mind being the center of attention.	0	0	0	0	0	(1+)
42.	Feel others' emotions.	0	0	0	0	0	(2+)
43.	Follow a schedule.	0	0	0	0	0	(3+)
44.	Get irritated easily.	0	0	0	0	0	(4-)
45.	Spend time reflecting on things.	0	0	0	0	0	(5+)
46.	Am quiet around strangers.	0	0	0	0	0	(1-)
47.	Make people feel at ease.	0	0	0	0	0	(2+)
48.	Am exacting in my work.	0	0	0	0	0	(3+)
49.	Often feel blue.	0	0	0	0	0	(4-)
50.	Am full of ideas.	0	0	0	0	0	(5+)

Note. These five scales were developed to measure the Big-Five factor markers reported in the following article: Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, 4, 26-42.

The numbers in parentheses after each item indicate the scale on which that item is scored (i.e., of the five factors: (1) Extraversion, (2) Agreeableness, (3) Conscientiousness, (4) Emotional Stability, or (5) Intellect/Imagination) and its direction of scoring (+ or -). These numbers should not be included in the actual survey questionnaire. For further information on scoring IPIP scales, click the following link: [Scoring Instructions](#).

Lifestyle Health-Related Self-Concept Questionnaire (Lifestyle-HRSC)

In the following, you find a list of health-related statements. Please indicate to what extent you disagree, or agree, with a given statement on a 7-point scale: [-3] = totally disagree, [-2] = widely disagree, [-1] = rather disagree, [0] = neutral, [+1] = rather agree, [+2] = widely agree, to [+3] = totally agree.

Example:	Totally disagree	Widely disagree	Rather disagree	Neutral	Rather agree	Widely agree	Totally agree
I read up on my health.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input checked="" type="checkbox"/> +2	<input type="checkbox"/> +3

In this example, [+2] has been checked on the rating scale which means the respondent *widely agreed* that he or she reads up on his or her health.

Please mark every statement with one cross (X), respectively. Please do not leave out a statement.

Health-related statement	Totally disagree	Widely disagree	Rather disagree	Neutral	Rather agree	Widely agree	Totally agree
1. I often have good feelings when I am active in everyday life.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
2. I need other people's support to act upon my physical activity goals.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
3. If I slip on my healthy eating, I can recover.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
4. The daily hassles and annoyances of choosing healthy foods bother me in my everyday-life.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
5. I am more likely to take the stairs than the elevator.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
6. In general, I practice healthy eating.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
7. I am capable of overcoming barriers to physical activity.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
8. Important others in my life influence me to eat unhealthy foods.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
9. I am afraid of developing diabetes.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
10. If I go on as in the past, I will develop diabetes.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3

11. I am not able to manage my negative thoughts.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
12. More and more, I suffer from physical symptoms from being sedentary or inactive.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
13. I have a positive attitude towards tracking my physical activity.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
14. Mostly, I am helpless with respect to my unhealthy eating behaviors.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
15. My lifestyle is risky for developing diabetes.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
16. It is difficult for me to actively track my weight.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
17. It is up to fate or chance whether I develop diabetes or not.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
18. I can still eat healthy in social situations.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
19. I feel accepted by my social support system.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
20. It does not bother me that unhealthy foods could compromise my health.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
21. I am not convinced that eating a low fat and low calorie diet could prevent diabetes.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
22. I find it enjoyable to eat high fat foods.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
23. I feel that I am a valuable person when I overcome obstacles to physical activity.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
24. I am a strong-minded person and can be active in my everyday life.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
25. Over the last two weeks I felt good about my ability to be active regularly.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
26. I am satisfied with how I am taking care of my body to prevent diabetes.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3

27. I am open to new physical activity experiences.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
28. I am a frequently stressed kind of person.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
29. I can quickly contact my social support system.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
30. I actively track my eating habits.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3
31. I feel lonely.	<input type="checkbox"/> -3	<input type="checkbox"/> -2	<input type="checkbox"/> -1	<input type="checkbox"/> 0	<input type="checkbox"/> +1	<input type="checkbox"/> +2	<input type="checkbox"/> +3

Physical Activity Enjoyment Scale (PACES) 18-items

Choose the statement that best describes your experience with this physical activity.

Item

1. I enjoy it; I hate it
2. I feel bored; I feel interested
3. I dislike it; I like it
4. I find it pleasurable; I find it unpleasurable
5. I am very absorbed in this activity; I am not at all absorbed in this activity
6. It's no fun at all; It's a lot of fun
7. I find it energizing; I find it tiring
8. It makes me depressed; It makes me happy
9. It's very pleasant; It's very unpleasant
10. I feel good physically while doing it; I feel bad physically while doing it
11. It's very invigorating; It's not at all invigorating
12. I am very frustrated by it; I am not at all frustrated by it
13. It's very gratifying; It's not at all gratifying
14. It's very exhilarating; It's not at all exhilarating
15. It's not at all stimulating; It's very stimulating
16. It gives me a strong sense of accomplishment; It does not give me any sense of accomplishment
17. It's very refreshing; It's not at all refreshing
18. I felt as though I would rather be doing something else; I felt as though there was nothing else I would rather be doing

