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Effect of Personality Type on Exercise Modality Choice

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Walden University

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Walden University

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Michael R. Koskiniemi

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Walden University
2018

Abstract

Effect of Personality Type on Exercise Modality Choice

by

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MA, Northern Michigan University, 2004

BS, Northern Michigan University, 2002

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The unhealthy lifestyles of many individuals throughout the world put them at risk for health problems, including infectious disease; endocrine, circulatory, cardiovascular, respiratory, and digestive disorders; and obesity. The modifiable health risks from unhealthy lifestyles account for a sizable percentage of health care costs. Regular exercise is recommended for health. However, currently little research exists regarding how individuals select which exercise regimens (personal training, group exercise, multimedia exercise, and self-directed) to follow. Selection of regimens that are based on one's personality may lead to regular, long-term exercise behavior. The purpose of this study was to examine whether personality was related to preference for different modalities among regular exercisers and whether the demographics of age and gender moderated this relationship. The theoretical foundation for the study consisted of the Big-5 personality theory. The nonexperimental quantitative, cross-sectional descriptive research design included the brief version of the Big-5 Inventory (BFI-10) and an exercise modality preference survey, which were administered to 199 individuals aged 25–65 years old who exercise at least twice a week. Results of the logistic regression analyses provided evidence that individuals highest on neuroticism levels were more likely to prefer group exercise while those highest on openness preferred any method of exercise that did not incorporate technology. The findings have implications for social change as they may guide health and fitness providers when recommending treatments to their patients to increase exercise adoption and maintenance. This, in turn, may improve individual health and lower costs associated with health care.

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Dedication

To my parents—Gary and Donna Koskiniemi—who modelled the value of hard work, education, family, and love.

To my children—Kamryn, Piper, and Jacob—who give me my biggest “why” in life. May you all one day understand that the price for success is high, but so is the reward. I love each of you to the moon...

To my wife—Sarah Koskiniemi—who for 14 years (and counting) enriches my life every day and supports my every endeavor. Without your unconditional love, support, and encouragement, I would never have come close to completing this. I love you Sarah.

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“If you can dream it, you can do it.”

~ Walt Disney

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Chapter 1: Introduction to the Study

Introduction

The adoption of regular physical activity is an important priority for public health advocates because of the documented health benefits of physical activity and suboptimal participation rates (Troiano et al., 2008). Many individuals have been socialized to adopt lifestyle behaviors for logic-based future rewards or outcomes such as better health, weight loss, and disease prevention (Troiano et al., 2008). However, many people have difficulty completing regular, ongoing physical activity programs (Rhodes & Pfaeffli, 2012). Researchers have identified many factors as predictors of physical activity or as success factors in physical activity, yet maintenance of physical activity behaviors remains low. Van Roie, Bautmans, Coudyzer, Boen, and Delecluse (2015) reported an average 50% drop in adherence to physical activity at a 6-month follow-up, for instance.

MacCann, Todd, Mullan, and Roberts (2015) suggested that personality is one of the major factors influencing an individual's participation in physical activity. Personality type may guide effective matching of individuals to the modalities of physical activity, which include personal training, group exercise, multimedia exercise, and self-directed exercise. McCrae and John's (1992) typology of personality showed five different personality types that have been related to product preferences and consumption behavior: Agreeableness, Extroversion, Conscientiousness, Neuroticism, and Openness, otherwise known as the Big-5 (Carlotta et al., 2015; Cherdchu & Chambers, 2013; Furnham & Tsoi, 2012; Turiano, Chapman, Gruenewald, & Mroczek, 2015).

In this study, I sought to identify whether there is a relationship between personality types and long-term use of specific exercise modalities. This research filled an existing gap in the literature because few studies have been conducted, according to my review of the literature, on personality types in relation to exercise preference and adherence. This study may benefit society by increasing the understanding of how personality influences exercise preference. Such knowledge may help health providers to encourage people to adhere to exercise regimens and become healthier. Physical activity participation rates may, thus, improve.

In this chapter, I present the background, problem statement, purpose, and research questions that informed the study. This chapter also includes sections on the theoretical foundation, assumptions, scope and delimitations, pertinent limitations, and significance of the study. In the concluding section, I summarize key points and offer a transition to Chapter 2.

Background of the Study

The importance of this study hinges on an understanding what is known about exercise and a healthy lifestyle in the United States. Exercising to achieve a healthy lifestyle can counter an unhealthy lifestyle; yet, many barriers to regular exercise exist (Randall et al., 2004). Insufficient time, social support, or access to exercise facilities and equipment are barriers to regular exercise for some individuals (Allen & Morey, 2010). For others, psychosocial and practical barriers are obstacles to exercise (Van Roie et al., 2015). Being able to overcome these barriers will help increase the likelihood that individuals exercise and successfully engage in a healthy lifestyle (Caviness, Bird,

Anderson, Abrantes, & Stein, 2013). There are different ways that exercise can be implemented so that these barriers are removed. People can attend a training facility if they do not have the equipment at home, or choose group exercise if they require social support to remain committed, for instance. Choosing the best exercise modality can make a difference in whether an individual succeeds or fails in achieving the goal of living a healthy lifestyle (Kahn, Brown, & Burton, 2012; Owen, Pettman, Haas, Viney, & Misan, 2010). However, little to no research has been conducted regarding the influence that personality traits have on exercise preferences. This study was necessary to fill this gap and help people and health providers understand the role of exercise factors in achieving a healthy lifestyle.

Problem Statement

Globally, many individuals have unhealthy lifestyles that lead to health problems, including the risk of infectious disease (Panwar et al., 2015); endocrine, circulatory, cardiovascular, respiratory, or digestive disorders (Panwar et al., 2015); and obesity (Groven & Engelsrud, 2010). According to Holicky and Phillips-Bell (2016), 29.4% of adults and 31.3% of children in the United States are obese. There are many factors that contribute to obesity and other chronic health conditions including social, economic, individual, and environmental factors. Regardless of the contributing factors, exercise is a very effective way to improve one's health (McArthur et al., 2014). According to Pedersen and Saltin (2015), exercise reduces the risk of cardiovascular disease, Type 2 diabetes, and obesity. As Harvey, Chastin, and Skelton (2013) noted, 60% of U.S. adults are sedentary most of their life. Although there is research in the field of psychology on

personality traits as predictors of behavior leading to a healthy lifestyle such as physical health (Ozer & Benet-Martinez, 2006), exercise frequency (Wilson & Dishman, 2015), and personality traits related to physical activity in general (Lochbaum, Litchfield, Podlog, & Lutz, 2012), there is little to no research, based on my review of the literature, on whether a person will choose a specific exercise based on their Big-5 personality traits.

Most researchers who have conducted studies on personality and exercise have focused on types of activities such as jogging and weightlifting. Although much attention has been given to the symbolic content of exercise, how individuals decide subjectively to exercise in the modern era and how exercise engages them psychologically have been neglected. Existing research on the role of exercise has primarily focused on what type of exercise people do rather than on what exercise modality people choose as a reflection of their personality traits (see Rhodes & Pfaeffli, 2012; Van Roie et al., 2015). Exercise behavior is not determined entirely by subjective variables, such as perceived importance of physical activity or social pressure, and cannot be separated from the structural aspects of exercise stimuli. As such, I was primarily concerned with determining what exercise modality choices are being made by people who have certain underlying personality predispositions as a determinant. Current psychological theories suggest that part of the total variation in individuals' response to exercise can be accounted for by personality, which mediates perception and the attributed meaning of exercise stimuli (Wilson, Das, Evans, & Dishman, 2015). Knowing whether exercise modality preference can be predicted by personality traits may provide a better understanding of how to help

individuals live a healthier lifestyle through increased exercise and maintenance of a healthy weight.

Purpose of the Study

The purpose of this quantitative study was to determine whether personality, as determined by the Big-5 personality traits, is associated with commitment to one of four common exercise modalities (personal training, group exercise, multimedia exercise, and self-directed exercise), and whether demographic factors moderate the relationships. One method of living a healthy lifestyle is by adding exercise to an individual's daily activities (Bruijn, Sniehotta, Osch, & Gardner, 2014). An important part of starting an exercise regimen is selecting an appropriate exercise modality. To this end, health-related research has revealed important insights about the potential role of personality in health behaviors by examining how they correspond to the way an individual perceives the meaning of exercise stimuli (Schultz & Schultz, 2016). Because of suboptimal participation rates in exercise, examining exercise health behaviors to determine successful interventions is important (Hall, Petruzzello, Ekkekakis, Miller, & Bixby, 2014). Within this context, the role of personality (specifically, whether the Big-5 is a determinant of participating in exercise) is an important area of inquiry, which may provide health care professionals insight on what exercise practices work best for certain individuals.

To help alleviate the increasing obesity problem in the United States (Hall et al., 2014), it may be helpful to scrutinize the underlying personality factors that influence health behaviors, to fit individuals with exercises aligned to their preferences based on

their personality characteristics, and to determine how this knowledge can help individuals live a healthier lifestyle through exercise. In this study, the independent variables were personality type, gender, and age. The dependent variable was the exercise modality preferred by individuals, which consisted of four categories: personal training, group exercise, multimedia, and self-directed exercise.

Research Questions and Hypotheses

RQ1: Are there differences in type of exercise used (personal training, group exercise, multimedia, and self-directed) by individuals, ages 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10?

H_01 : There will be no significant differences in type of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

H_{a1} : There will be significant differences in types of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

RQ2: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by gender?

H_02 : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by gender.

H_{a2} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by gender.

RQ3: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by age?

H₀₃: The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by age.

H_{a3}: The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by age.

Theoretical Foundation

According to the Big-5 personality trait theory, underlying tendencies cause and explain a consistent pattern of thoughts, feelings, and actions in individuals (McCrae & Costa, 1995). Over the years, the Big-5 has emerged as the dominant theory for personality. It is the basis for many valid test instruments (Cooper et al., 2013) and has been found to be an important predictor of physical health (DeYoung et al., 2010). Traits help distinguish a person's behavior differences over time, the consistency of behavior, and the stability of behavior across situations (Oliver et al., 2008). Five different personality domains are included in the Big-5 personality trait approach: Extraversion, Neuroticism, Openness, Agreeableness, and Conscientiousness (McCrae & John, 1992). According to McCrae and John (1992), neuroticism is typically defined as the presence of distress; high scores on neuroticism indicate the negative emotions that are typified by individuals with low self-esteem, poor control of impulses, and irrational thinking. Low scores in neuroticism indicate that individuals generally are happier and have a greater satisfaction with their lives. High extraversion personality types are defined as cheerful, talkative, sociable, and warm, whereas low extraversion types are typically shy, retiring,

and quiet (McCrae & John, 1992). Individuals who are high in agreeableness exhibit nurturing, caring, and emotional support while low agreeableness types appear hostile, spiteful, jealous, and self-centered. Individuals with a high conscientiousness score tend to exhibit behaviors of diligence, achievement orientation, and neatness and individuals while those with low conscientiousness exhibit the relative absence of these characteristics. Finally, individuals who have a high openness value are open to new experiences, are creative, enjoy intellectual pursuits, and have a need for variety and unconventional values. Individuals low in openness are typically conventional, prefer routine, and have a narrower range of pursuits (McCrae & John, 1992). These facets of personality formed the basis of this study.

The most common traits related to personality are captured in five dimensions: Agreeableness, Extroversion, Conscientiousness, Neuroticism, and Openness, or the Big-5 (McCrae & John, 1992). Research on the Big-5 personality dimensions has shown that the Big-5 model incorporates a wide range of personality constructs, offers a foundation for systematic exploration of relationships between personality and other constructs, and provides a global description of personality (McCrae & John, 1992; Pervin & John, 1999; Stewart & Devine, 2000). The Big-5 personality dimensions illustrate the most significant ways that individuals differ in their emotional, interpersonal, pragmatic, attitudinal, and motivational styles (McCrae & John, 1992; Pervin & John, 1999; Stewart & Devine, 2000). In other words, the Big-5 personality dimensions account for most of the variation in human behavior (Pervin & John, 1999). As such, the Big-5 was the most

appropriate lens for examining whether personality is associated with commitment to one of four common exercise modalities.

Nature of the Study

I aimed to better understand the exercise modalities consistently used by individuals with different personality types. To investigate whether personality determines exercise modality choice, I collected data from participant surveys. I chose a quantitative method for this study because of the need to have numerical evidence of the relationship between personality and exercise modality selection. Current researchers (Yap & Lee, 2013) have examined what participants think about personality and physical activity selection. However, few researchers have conducted studies involving the analysis of numerical participant data about personality and exercise modality selection (MacCann et al., 2015). MacCann et al. (2015) noted that the relationship between personality and exercise modality presents an interesting topic for further research. I extended and expanded upon this call for research by examining personality traits as a predictor of exercise modality.

Choice of different types of exercise was the dependent variable, which had four levels: personal training, group exercise, multimedia exercise, and self-directed. The Big-5 from the International Personality Item Pool were the independent or predictor variables. They were Neuroticism, Extroversion, Openness to Experience, Agreeableness, and Conscientiousness. Potential moderator variables were gender and age. I collected data through Survey Monkey Audience from individuals who exercise regularly (at least two times a week, for the past 6 months or more). Each exercise modality was explained

clearly, and participants were asked to select the one modality that best described their primary form of exercise. In my professional experience as a fitness facility owner and personal trainer during the last 15 years, I have found that people predominantly use only one exercise modality and are able to verbalize preference for one modality. I calculated descriptive statistics using the demographic information provided by the participants. Inferential statistics, including multinomial logistic regression, were used to test the hypotheses of this study.

Definitions

The following operational definitions are helpful in understanding the research findings of this study. The definitions cover the Big-5 personality traits, including openness, conscientiousness, extroversion, agreeableness, and neuroticism.

Agreeableness (A): Individuals who are agreeable are warm and affectionate. They tend to be trusting and altruistic. These individuals value social harmony and get along well with others. They can understand others' emotions, intentions, and mental states. Agreeable personality is associated with high performance in groups (DeYoung et al., 2010).

Conscientiousness (C): Individuals who are conscientious strive for achievement. These individuals are reliable and decisive. They are goal-oriented and prefer planned behavior over spontaneity. Conscientiousness individuals can constrain impulses to follow rules or regulations. This personality trait is associated with industriousness, orderliness, and self-discipline, and corresponds with adherence to exercise regimens and better performance (DeYoung et al., 2010).

Extroversion (E): Individuals who are extroverted are individuals who have a need for social interaction. These individuals do not like to be alone much of the time. They are assertive, full of energy, and adventurous. This personality trait is associated with positive emotions and enthusiasm (DeYoung et al., 2010).

Openness (O): Individuals who are open are intellectual and creative. These individuals think in a more abstract versus concrete manner, and they tend to be nonconforming. This is the only trait that is consistently and positively related to intelligence. These individuals like learning things for the sake of learning (DeYoung et al., 2010).

Neuroticism (N): Individuals who are neurotic are emotionally reactive and tend to experience negative emotions such as insecurity, irritability, depression, and hostility. These individuals have low self-esteem, rumination, and emotional dysregulation. They experience burnout and changes frequently (DeYoung et al., 2010).

The following definitions cover the four exercise modalities: personal training, group exercise, multimedia exercise, and self-directed exercise.

Group exercise (GE): A form of exercise that offers social inclusion opportunities, physical benefits, and psychological support for groups of people.

Multimedia exercise (ME): A form of exercise that is delivered digitally through DVD or the Internet.

Personal training (PT): A form of exercise that is prescribed by a personal trainer. This person possesses the knowledge, skills, and abilities for safe and effective exercise and fitness programs.

Self-directed (SD): A form of exercise where the individual chooses what type of exercise he or she will do, with what intensity that individual will perform it, and the amount of time he or she will spend doing it. Examples are weight training, walking, running, stretching, and jumping rope.

Assumptions

Several assumptions were present in this study. One assumption was that the participants of this study were honest in their Survey Monkey initial screening procedure. The participants were collected from Survey Monkey based on the inclusion criteria of the study. All participants stated that they exercise at least twice a week; therefore, the assumption was that all the participants are exercising at least two days a week at this time. Another assumption was that the participants were honest answering all the survey questions presented. A fourth assumption was that all participants answered the questions from their experiences and did not enlist the help of anyone else. The last assumption was that the participants had the cognitive ability to read and understand all survey questions.

Assumptions About Measures

I used the Big-5 Inventory 10-item version or BFI-10 by Rammstedt and John (2007) because I wanted a short and psychometrically sound instrument that can actually be used in training facilities to quickly identify the personality type to match to modality type, if my study shows the expected relationships. The BFI-10 is an appropriate representation of the BFI-44, from which this measure was derived (Rammstedt & John, 2007). The short version was created to reduce the time in which this measure takes to administer. The test retest reliability was good with the alpha coefficient .78 in the United

States and the internal consistency on the five traits are extroversion .89, agreeableness .74, conscientiousness .82, neuroticism .87, and openness .79 (Rammstedt & John, 2007). The inter-correlations of the five traits average .11, which shows excellent discriminate validity.

Assumptions of Analysis

According to Warner (2008), the assumptions of binary logistic regression are as follows: (a) the outcome variable is dichotomous, coded 1 or 0; (b) the outcome variable scores must be statistically independent of each other; (c) the model must include all relevant variables and exclude any irrelevant predictors; and (d) the outcome variable must be exhaustive and mutually exclusive to one group.

Scope and Delimitations

This study pertained to the personality traits individuals may have that help them make decisions about exercise modality preference. The primary research question for this study was, Are there differences in exercise modality used (personal training, group exercise, multimedia exercise, and self-directed exercise) by individuals, ages 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience? The null hypothesis was that there are no differences in type of exercise used by people who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience. I expected that the full model with the six independent variables would be able to predict type of exercise better as compared to a model without the predictor variables. These predictions were made based on the ability to combine the variables.

These factors set the stage for a prediction that the Big-5 personality traits predict exercise modality preference.

This study did not involve use any fitness facility as the setting. One of the advantages for not choosing a fitness facility is the ability to track distinctions between a very diverse group of individuals. I only used individuals who were exercising a minimum of two times per week for the past six months. This is because I wanted people to have consistent exercise routines in place with specific modalities they use. Participants were 25 to 65 years of age. This is the largest segment of the population using a variety of modalities for exercise and striving to live a healthier lifestyle.

I collected data through a Survey Monkey Audience from individuals between the ages of 25–65 who exercise regularly (at least two times a week, for the past six months). I clearly explained each exercise modality and participants were asked to select the one that best describes their primary form of exercise. Participants had to choose only one modality, their preferred. In my professional experience as a fitness facility owner and personal trainer during the last 15 years, I have found that people predominantly use only one exercise modality and are able to verbalize preference for one modality. This study has the potential to be generalized to any population of individuals who exercise regularly, given the focus on personality types. Any professionals whose patients are between the ages of 25 and 65 and exercise regularly could generalize the data found in this study to their patients in their practice.

Limitations

A potential limitation was the participants' truthfulness while participating in the study, also known as self-report bias. No individual monitored the survey process, so it is possible that the participants rushed through the survey to quickly complete it. In addition, the quantitative nature of this study restricted the findings to a rejection or acceptance of each null hypothesis, rather than an exploration of complex perceptions, ideas, and perspectives. Though there is no safeguard against dishonest responses, participants were anonymous and encouraged to be truthful; this is noted as an assumption of the study, and the validity relies in part on this assumption. In addition, the purpose of the study was not to elicit a comprehensive understanding of any social phenomenon, but instead to make statistically supported inferences regarding the population of interest.

As I did not have control of the data that participants entered, and treated data naturalistically (i.e., I did not manipulate values or use inappropriate statistical analyses), researcher bias was minimal. Additionally, investigator bias was controlled because there was no conflict of interest for the researcher; this is a real question for me as a researcher and personal trainer about which I do not have preconceived notions. Construct validity is well-established for the BFI-10, with a mean correlation among items of .83 and a test-retest stability of .75 on average (Rammstedt & John, 2007). In addition, the possibility that confounding effects influenced the results is always present in a quantitative study; as such, I used the demographic variables during analysis to control for the variance that

these traits may explain. Such demographic variables also helped me and future readers to interpret the generalizability of the results.

Significance of the Study

If personality determinants of physical activity preference among the physically active can be discovered, individuals who are not physically active could be given appropriate recommendations based on personality type, which may then increase adoption and adherence. Being able to predict which exercise modality is best suited for an individual with certain personality and demographic characteristics may lead to knowledge and programs to help people adopt physical activity into their daily lives by choosing the modality in which they are most likely to be active.

This study contributes to a better understanding of the putative factors that may contribute to the choice of exercise modality, specifically investigating whether personality characteristics significantly contribute to the individual's choice of the modality. Studies on personality and exercise have typically focused on types of activities such as jogging, weightlifting, etc. Most research interest on the role of exercise has focused on what type of exercise people do, rather than on what exercise modality people choose as a reflection of their personality traits. As such, I was primarily concerned with determining what exercise modality choices are being made by people who have certain underlying personality predispositions as a determinant.

The social implications of this study relate to improved knowledge of variation between individuals' preference for exercise modalities, thereby improving people's exercise experience. This finding contributes to practice by enabling health professionals

to develop and implement a primary prevention plan that would increase the odds that individuals change their behaviors for good, resulting in social change. Knowing the relationship between personality type and exercise modality of choice can be useful to health professionals who can recommend the best exercise modality for a person's characteristics, which will help with adoption and adherence. Primary prevention methods then may be used to minimize the chances of the individual ever becoming inactive again.

Through this study, I focused on predicting exercise modality preferences by using the personality traits in the Big-5 (McCrae & Costa, 2008) grounded in the biopsychosocial model (Adler, 2009). Personality traits form the context for specific behaviors for everyone (McCrae & Costa, 2008). Personality allows for an understanding of why people do what they do and helps predict future behavior because of their stability over time (Oliver, Naumann, & Soto, 2008). To effectively analyze personality, the persona and the systems that make up behaviors must be studied, including both outward and inward responses to determine what causes those behaviors (Hunt, 2007). Expanding the knowledge of how personality affects health-related behaviors will help alleviate unhealthy behaviors such as failure to exercise, because health providers will then be able to identify what types of exercise will lead to persistence and success in physical activity and thus better advise their clients (Panwar et al., 2015), increase exercise participation (Allen, 2014), decrease health problems (Centers for Disease Control and Prevention, 2017), reduce mental health problems (Khan, Brown, & Burton, 2013), and allow for a longer and healthier life.

I advanced the scientific knowledge by using the Big-5 as it relates to the biopsychosocial model by determining the relationship, strength of the relationship, contributing personality traits, and if a possible prediction can be made between personality and exercise modality preferences. Over the years, the Big-5 has emerged as the dominant theory for personality and is the basis for many valid test instruments (Cooper, Knotts, McCord, & Johnson, 2013).

I uncovered exercise modality options that lead to successful exercise maintenance for the long-term, thereby extending the existing literature. The ability to start to exercise and maintain it for the long-term has significant implications for treating a wide range of problems and social issues (Yanovski & Yanovski, 2011). Health and fitness professionals, medical professionals, obese patients, mental health professionals, and the overall community have been searching for strategies to effectively choose an exercise modality and maintain for the long-term for decades (Graves, 2010).

Implications for Social Change

The implications for social change are cross-disciplinary and global with the potential to increase and improve societal well-being. Investigating individuals' exercise modalities, such as personal training, group exercise, multimedia and self-directed, and the decisions they make about choosing these modalities and successfully using them has important implication for fitness and medical communities. Further, enabling people to choose an appropriate exercise modality could have a domino effect of social implication such as improved economics, increased productivity at work, and improved quality of life

both psychologically and physically. These changes could increase positive social relationships and interactions within the family, community, and work environment.

This study has long lasting social change implications in exercise development. The findings may assist in gaining a better understanding of the relationship between personality factors and exercise modality. This study may inform individuals, health practitioners, and organizations how they can affect the lives of individuals through better exercise modality choices.

Summary

Evidence shows that living a healthy lifestyle is extremely important in people's daily lives (Groven & Engelsrun, 2010; Harvey et al., 2013; Panwar et al., 2015). It is agreed among researchers that exercise is crucial in living a healthy lifestyle (Graber et al., 2011; Graham, 2012; Pedersen & Saltin, 2015). Research has found that one important factor when looking at exercise behaviors is the personality traits in the Big-5, including openness, conscientiousness, extroversion, agreeableness, and neuroticism (Litchfield et al., 2012; Parks-Leduc, Feldman, & Bardi, 2015; Wilson & Dishman, 2015). Although there is a diverse range of topics relating to exercise and the personality traits that predict exercise behaviors, there is limited research related to best modalities for individuals. Because of the lack of research in this area, it was beneficial to explore how the personality traits of the FFM can predict exercise modality preferred by regular exercisers.

Chapter 2 includes a review of the literature of the FFM, the biopsychosocial model, and how they relate. I go in-depth about the Big-5 personality traits, including

openness, conscientiousness, extroversion, agreeableness, and neuroticism. This chapter also includes a discussion on exercise modalities, including personal training, group exercise, multimedia exercise, and self-directed.

Chapter 2: Literature Review

Introduction

A major problem in the 21st-century society is that too many individuals are living an unhealthy lifestyle that leads to health problems, including the risk of infectious disease (Panwar et al., 2015); endocrine, circulatory, cardiovascular, respiratory, or digestive disorders, and obesity (Groven & Engelsrud, 2010; Panwar et al., 2015). The purpose of the present study was to determine whether personality, as measured through the Big-5 factors, is associated with commitment to one of four common exercise modalities (personal training, group exercise, multimedia exercise, and self-directed), and whether demographic factors moderate the relationships. If personality determinants of physical activity preference can be discovered, individuals could be given appropriate recommendations based on personality type, which may then increase physical activity adoption and adherence rates. Being able to predict which exercise modality is best suited for an individual with certain personality and demographic characteristics may lead to knowledge and programs to help people adopt physical activity into their daily lives by choosing the modality in which they are most likely to be active.

Understanding personality allows for an understanding of why people do what they do and helps predict future behavior because of the stability of these this link between personality and actions over time (Oliver et al., 2008). Understanding the relationship between personality and exercise may help health providers to identify what types of exercise will lead to persistence and success in physical activity and thus better advise their clients (Panwar et al., 2015) and increase exercise participation (Allen,

2014). Alleviating unhealthy behaviors in this way may decrease physical health problems (Centers for Disease Control and Prevention, 2017), reduce mental health problems (Khan et al., 2013), and allow individuals to have longer and healthier lives. By capitalizing on the relationship between personality and exercise modality, a person's likelihood of reverting to inactivity may be minimized. This chapter consists of a review of the current literature on the biopsychosocial model; the Big-5 personality traits (Neuroticism, Extroversion, Openness to Experience, Agreeableness, and Conscientiousness); exercise modalities (personal training, group exercise, multimedia exercise, and self-directed); and gender, age, and support from important others as moderators.

Literature Search Strategy

The literature reviewed in this chapter was the result of an exhaustive search of peer-reviewed journals found in academic databases and from writing to the experts and authors of key assessment tools and other relevant articles. The academic databases used in this study predominantly consisted of PsycINFO and PsycARTICLES. I obtained peer-reviewed journals and articles using key words that included *personality*, *exercise*, *physical activity*, *Big-5*, *theory of planned behavior*, *Big-5 personality traits*, *personality assessment tools*, *Big Five Inventory (BFI-10)*, *Myers-Briggs*, *MANOVA*, *moderators*, and *covariates*. An Internet search using some of same key words, and restricted to only articles published by organizations, educational institutions, or government agencies helped to ensure the validity of data and their relation to the study. I reviewed scholarly literature published within the last 5 years, as well as seminal peer-reviewed literature.

Theoretical Framework

Big-5 Personality Traits

The theoretical framework for this study was the Big-5. McCrae and Costa defined the current model in 1995. The Big-5 has become the dominant theory for personality (Cooper et al., 2013). In addition, it has been found to be an important predictor of physical health (DeYoung et al., 2010). Researchers have yielded evidence that various health outcomes such as cardiovascular diseases, diabetes, and gastroenterological complaints are related to personality differences (Chapman, Roberts, & Duberstein, 2011).

Nevertheless, Iwasa et al. (2009) stated that health promotion interventions do not incorporate personality traits as a vital component. Researchers have explored the incorporation of biomedical characteristics and demographic such as age, inflammation biomarkers, genes, and disease manifestations into disease treatment and prevention guidelines (Fiscella, Kawachi, & Duberstein, 2009). When planning, implementing and assessing physical activity interventions, referring to an individual's personality traits may be helpful, I believe. This may improve the utilization, adherence, and outcome of these exercise suggestions and services in a way that is beyond the ability of data contained in a person's demographic or biomedical profile.

Regarding exercise selection, some researchers have assessed psychological processes and the influence of personality on health-related exercise and physical activity choice, such as walking, working with a personal trainer, or taking a group exercise class (Chapman, Fiscella, Kawachi, & Duberstein, 2009; Flynn & Smith, 2007; Iwasa et al.,

2009). Most researchers conducted these studies among individuals with impaired physical or mental health or populations to risk for obesity, such as older adults. In contrast, the role of personality in use of preventive health choices such as personal training, group exercise, multimedia exercise, or self-directed exercise among healthy individuals has not been examined, according to my review of the literature.

Knowledge on how and whether personality traits influence healthy individuals to use services such as personal training, group exercise, multimedia exercise, or self-directed exercise may enable health practitioners and policy makers to alter their methods or interventions towards implementing and marketing these options through intense follow-up for individuals bearing specific traits. Therefore, the inclusion of both at risk and healthy groups may further understanding of the role that personality plays in exercise modality decision making. The following sections include a review of each of the five factors regarding their association with the likelihood of choice of exercise modality.

Neuroticism. Individuals who are neurotic are predisposed to interpret various exercise stimuli as threatening, to experience negative emotions towards exercise, and to view exercise pessimistically (Costa & McCrae, 1992; Novak et al., 2017). Research studies have consistently shown that neuroticism is associated with negative beliefs and prognoses and leads to poor exercise habits (Lahey, 2009). Research suggests that to minimize the unpleasant feelings towards exercise, exercise-related choice can be influenced in two ways for neurotic individuals. Connor-Smith and Flachsbart (2007) stated that highly neurotic individuals are more likely to use certain avoidance,

withdrawal, and flight behaviors towards exercise. In the context of the present study, neurotic individuals who are informed of a desired exercise modality (i.e. personal training, group exercise, multimedia, and self-directed) may be motivated to preserve their modality decision and therefore refrain from withdrawing their exercise decision. That is, by maintaining their exercise, neurotic individuals will improve their ability to continue to exercise. In contrast, the *exercise nut*, according to Allen, Magee, Vella, and Laborde (2017), is a specific type of neurotic individual who is hypervigilant about getting exercise and being in shape. These individuals engage frequently in physical activities and exercise to allay their concerns about acquiring chronic health problems or becoming overweight. I explored the association between neuroticism and the odds and the frequency of exercise modality choice but offered no a priori hypotheses regarding expected observations.

Extraversion. Extraverted individuals are devoted to reward seeking and foraging (Carver & White, 1994). Extraversion commonly referred to an appetitive positive affect system where individuals seek to implement health behaviors that are associated with positive rewards such as physical activity and exercise (De Bruijn, Kremers, Van Mechelen, & Brug, 2005). However, exercise can be associated with competition. This can create negative rewards for the loser that triggers negative effects. I expected those scoring highly on extraversion to be less likely to think of exercise as competitive and to return to their chosen modality frequently. Additionally, extroverts are more likely to be reckless with their health and have high positive mood states. In turn, they tend to adopt

maladaptive health behaviors such as avoidance of participation in exercise and perceive themselves as less vulnerable (Gruber, Mauss, & Tamir, 2011).

Conscientiousness. Conscientious individuals tend to be goal-oriented, plan-oriented, dutiful, and orderly in the implementation of their exercise and physical activity plans (Costa & McCrae, 1992; Roberts, Lejuez, Krueger, Richards, & Hill, 2014). These qualities could prevent missed exercise sessions and could also enhance success of exercise goals. Chapman et al. (2011) found that conscientiousness is positively associated preventive health behaviors such as exercise and with lower overall risky health behaviors such as skipping exercise resulting in lower medical burdens. Conscientious individuals may tend to take a more active role in trying to improve and maintain their exercise habits and reflect upon the future consequences of physical activity choices (MacCann et al., 2015). I proposed that conscientious individuals are more likely to routinely exercise and are aware that a lack of physical activity can increase the likelihood of being diagnosed with new disease as time passes.

Openness to Experience. Openness to Experience individuals have a proclivity for new exercise experiences (Costa & McCrae, 1992; Woo et al., 2014). People high in Openness are curious and intelligent about different physical activities. Allen et al. (2017) found they view participation in exercise as a fruitful experience and are motivated to repeat it. De Bruijn and colleagues (2005) state that individuals high in Openness are interested in expanding their base of knowledge in fitness and seeking new exercise options and ideas. In the context of the present study, it was possible these *exercise experience seekers* were more proactive in seeking out a personal trainer who will afford

them an advantage involving success with their health and fitness goals (Iwasa et al., 2009).

Agreeableness. Agreeableness is a composite of several lower-order traits related to: honesty, altruism, trust, compliance, and interpersonal deference, and maintaining interpersonal harmony (Costa & McCrae, 1992). Individuals on the low end of this dimension may be egocentric, competitive, and skeptical about other people's intentions such as a personal trainer (Bruijn et al., 2014). Those individuals scoring high on agreeableness are likely to comply with recommendations for exercise, have a compliant and trusting nature with a personal trainer, which may be associated with lower skepticism regarding physical activity choices, as well as with a predisposition to. Ciechanowski, Walker, Katon, & Russo (2002) show there is evidence that trusting others, specifically when working with a personal trainer, is an important factor in exercise utilization.

Literature Review Related to Key Variables and Concepts

Personality and Exercise

Over the past few decades the concept of fitness personality has been a topic of growing interest. Recent findings suggest it can be used to open a dialogue with individuals about their exercise choices (Allen & Laborde, 2014). Professionals who understand how the Big-5 personality traits (extraversion, agreeableness, openness, conscientiousness, and neuroticism) related to various exercise modalities can help clients and patients identify more satisfying physical activities. Health and fitness professionals may increase client compliance with exercise prescriptions by using simple

tools for matching personality types with modalities. Clients and patients who complete a personality assessment may gain additional motivation and insights to pursue regular physical activity and exercise for a lifetime.

Exercise participation rates in North America have remained at approximately 20% of the adult population during the past few decades, despite mounting evidence that supports the value of regular activity for physical and psychological well-being (CDC, 2016). Efforts to promote physical activity and exercise have been varied and extensive, yet gains have been modest at best. Bruijn and colleagues (2014) state that a widely-advocated tactic has been to match fitness programming to personality and individual traits in recent years. To help patients and generate discussion, physicians can also use this approach to help them discover how physical activity options mesh with their personalities.

Individuals who are physically active engage in a wide range of fitness and sports and pursuits (Corbin, 2016). Whether influenced by fashion, convenience, or personal inclination, exercisers avoid specific physical activities and gravitate toward others. For example, some people identify themselves as dedicated yogis; others consistently participate in running or dance classes.

Personality may influence activity choices. Countless studies explored the relationship of sport choice and personality traits to participation through the 1970s and 1980s. Most of the research yielded results that could rarely be replicated (Cooper et al., 2013). For example, some studies characterized runners as depressed, compulsive, suited to monotonous, repetitive situations, inhibited, taciturn, introverted, cautious, and

deliberate (DeYoung et al., 2010). Others described runners as optimistic, sociable, well-adjusted, and sexually active (Ebstrup, Aadahl, Eplöv, Pisinger, & Jørgensen, 2013). One report found that body builders had a pathologic preoccupation with muscularity, but another investigation found them to be quite normal (Graham, 2012; Groven & Engelsrud, 2010). Martial artists were depicted as having relatively low levels of aggression, while in another reported to be highly aggressive (Hirsh, Kang, & Bodenhausen, 2012). The general trend describes regular exercisers as well-adjusted even though they have been described as obsessive-compulsive and narcissistic by one researcher (Hunt, 2007).

Research had offered few definitive answers to questions of association between activity choice and personality by the end of the 20th century. In the emerging interest in the Big-5 personality traits, some hopeful signs may, however, be found within new personality research on exercise and exercise settings (Khan et al., 2013). It seems logical to identify activities that are more suited to individuals' personalities or personal styles, rather than directing them toward ones that do not interest them after the question of competency has been assessed. Kahn, Brown, and Burton (2013) suggested that people are more likely to participate in activities that closely match their personalities.

Matching will ideally rely on identifying traits common to both individuals and physical activities. Indicators of congruence will guide the advisement of patients and clients in activity choices through comparisons between individual and physical activity ratings on personality traits. The result would be a suggested list of highly compatible

physical activities that the individual could pursue to build selected competencies and increase adherence.

Although previous researchers have done an adequate job of discussing living a healthy lifestyle through exercise (Center of Disease Control and Prevention, 2011; Graham, 2012; Haskel et al., 2007), using personality as a predictor variable (Lee & Laffrey, 2008), concluding outcomes of exercise attendance (Lit et al., 2002), behavior maintenance (King et al., 1996), and exercise adherence with preference (Oman & King, 1998), little research exists regarding exercise modality preference through the biopsychosocial model. Oman and King (1996) stated that health promoters should look at tailoring exercise programs to match individual preferences through biopsychosocial mechanisms. The previous conclusion leads to the variable in this research study of personality predicting exercise modality preference. It is possible that if an individual does not use personality to choose exercise modality preference, then he or she may become one of the 60% of adults who are sedentary (Harvey et al., 2013).

Previous researchers have also studied the personality traits of the Big-5 predicting exercise behaviors (Connor & Abraham, 2001), such as participation, frequency and performance (Wilson & Dishman, 2015), intention (Connor, Rogers, & Murray, 2007), and motives (Ingledeew & Markland, 2008); however, no research has been done on predicting exercise modality preference. Although Hall et al. (2014) did some research on exercise preference, they analyzed several variables including exercise behaviors, exercise motives, exercise barriers, and exercise preferences. They found that preference for group exercise was correlated with extroversion using a MANOVA;

however, they did not make a prediction of exercise training preference based on all the personality traits in the FFM. Coruneya and Hellsten (1998) stated the most interesting topic for future research is examining the relationship between personality and exercise preferences. Predicting exercise training preference would be a logical step forward from the research of Hall et al. (2014) with their work on individual preferences.

There is research combining social cognitive theory, specifically self-efficacy, and the Big-5 predicting exercise behaviors (Lee & Klien, 2002); however, there is no research examining the biopsychosocial model and the personality traits of the Big-5 to predict exercise modality preference. Much of the research examining exercise behaviors combine the theory of reasoned action or theory of planned behavior (Blue, 1995; Didarloo et al., 2011; McEachan, Sutton, & Myers, 2002, 2010) and personality traits. Although there is a basis for using the theory of reasoned action and theory of planned behavior to examine exercise behaviors, a logical step forward with research would be combining the biopsychosocial model and the personality traits of the Big-5.

There are also contradictions in different studies that have been presented. According to Rhodes and Smith (2006), only the personality traits of extroversion, neuroticism, and conscientiousness are correlated with physical activity; however, research shows that openness and agreeableness have also been related to exercise behaviors (Hausenblas & Giacobbi, 2004; Ingledew & Markland, 2008; Wilson & Dishman, 2015). It has been demonstrated that all personality traits have been correlated to exercise behaviors in one form or another; therefore, all the personality traits should be examined when predicting any type of exercise behavior.

Moderators

Gender. Gender is one of the potential moderators of this relationship of the participants. For example, Furnham and Tsoi (2012) found almost all the studies conducted on the five-factor model and exercise include either samples with a majority female composition or exclusive female samples. In addition, it is important to note that only one study to date has compared males and females based on three of the Big-5 personality traits (Yap & Lee, 2013). However, several studies have reported gender differences (Lochbaum et al., 2010). Expression of personality traits like extraversion or neuroticism make it possible that they may differ by gender (Furnham & Tsoi, 2012). A marked and reliable difference in trait expression suggesting the absolute values of personality (i.e., mean) traits differ by gender (Furnham & Tsoi, 2012). In terms of exercise participation, the well-demonstrated Centers for Disease Control and Prevention (2017) gender discrepancy favoring males over females potentially suggests that more discrepant personality values are related to participation in exercise for females but not necessarily for males. By contrast, personality, regardless of gender, may relate to exercise behavior if it is a more fundamental and less contextual behavior in personality trait expression. Clearly research of whether gender moderates the personality and exercise relationship are needed to shed light on this issue.

Age. Although more population-level research on age, personality, and physical activity is needed, the results of existing studies generally suggest that age is not a moderator of the personality–physical activity relationship (Schneider & Graham, 2009).

This supports the temporal stability inherent in personality research generally and suggests that personality may be a systematic and continual correlate of activity.

Only one study covered a sufficiently wide age spectrum to evaluate young, middle-aged, and older adults (Rhodes & Smith, 2006). Despite the age-related decline in physical activity no age-related differences were identified for Eysenck's N or E traits. Given the size of the sample ($n = 19,288$) and the repeated-measures 11-year longitudinal design, this is a convincing study. Some evaluation of major traits can be made based on the age range of studies, unfortunately, inadequate information is present in the remaining studies to include this factor in meta-analysis. The physical activity and personality literature is biased towards young adults. Schneider and Graham (2009) found an association between physical activity and E. Samples to assess N of Schneider and Graham (2009) found a negative association with physical activity. Finally, an evaluation of C by Schneider and Graham (2009) found a significant positive association with physical activity.

Similar findings are apparent in middle-aged and older population samples (Rhodes & Smith, 2006). Of the samples that assessed E, Rhodes and Smith (2006) found it positively related to physical activity, studies that measured N found it a negative correlate of physical activity. Finally, Rhodes and Smith (2006) studied the measure C and found a positive association with physical activity.

Exercise Modalities

The American College of Sports Medicine (2010) stated that exercise and physical activity are beneficial for health. Energy expenditure is the result of physical

activity through all forms of exercise that require skeletal muscle to produce the necessary bodily movements to perform the task. Allen and Laborde (2014) stated muscle strength, cardiorespiratory endurance, and flexibility are the three traditional components of fitness. All three are important to a complete training program and all need to be considered and respected as part of the program. The current study focuses on personality and exercise (modality) only. Buckworth and colleagues (2013) defined these modalities as structured, planned, repetitive physical activity with the intention to maintain or improve health or physical fitness. IHRSA (2015) stated worldwide there are approximately 144 million people who exercise in fitness clubs worldwide. Four modalities are the most popular, effective, and used, regarding exercise: personal training, group exercise, multimedia exercise, and self-directed exercise. Research on these four modalities is limited (Middelkamp & Steenbergen, 2015), but there are strong indications that these are the four choices individuals are making regarding choosing exercise.

Often people select the types of exercise they like the best and only train in those modalities (Conner, Rodgers, & Murray, 2007). For example, some people only like working with a personal trainer, working out on the days they meet with their trainer but neglecting the other days of the week and as a result find themselves not progressing as effectively as possible. Others prefer group exercise, working out for hours per week but finding themselves chronically injured. In both scenarios they are incomplete. Regardless how successful each of these fitness enthusiasts are in their favorite areas of training they are neglecting the very important components that create a completely healthy and fit

person (Conner et al., 2007). Strength is very influential on an active lifestyle, but it is one of the most neglected areas of fitness (Crone, 2005). A moderate to high level of strength is important for efficient movement. If a person disregards strength, their muscles and connective tissues can lose elasticity and dispensability making exercise less efficient and potentially contribute to injury. Working with a personal trainer is the most effective way to make a point to include strength training as a regular part of a training program (Graham, 2012).

Personal training. Several studies have demonstrated the significance of personal trainers. Ratamass et al. (2013) compared individuals who worked out on their own to individuals who were trained by personal trainers. Results showed that both Ratings of Perceived Exertion and Repetition Maximum scores were significantly higher in individuals who worked under the supervision of a personal trainer. Similar results were noted in studies by De Lyon, Neville, and Armour (2016) and De Lyon and Cushion (2013). Motivation is a major part of the advantage of working with personal trainers, and that, “certified personal trainers can provide structure and accountability, and [can] help ... develop a lifestyle that encourages health.”

An intensive search of the literature, however, provided only a few articles that specifically tested whether personal training was successful in effecting behavior change (De Lyon & Cushion, 2013; De Lyon et al., 2016; Storer, Dolezal, Berenc, Timmins, & Cooper, 2014). Club managers, as well as personal trainers, believe that clients are more likely to stay with a program if the trainers exhibit the listening skills, attributes of empathy, and motivation skills (De Lyon & Cushion, 2013). In addition, important

components of clients' satisfaction with their fitness clubs relate to the leaders' instructional competency and social support skills (McGuire, Anderson, & Trail, 2006). Despite these findings, little is known about how a person's personality traits connect with choosing to have a personal trainer. To my knowledge, this study was the first scholarly examination of the current state of personal training from this perspective.

Group exercise. Middlekamp et al. (2016) reported studies on group exercise behavior in general is limited. Research indicates positive correlations with group exercise adherence and attendance. Hover et al. (2012) reports that 60 percent of females and 45 percent of males participate in group exercises programs and classes with most of these people participating in two or more types of classes and programs. Specifically, 50% participate in at least one group exercise program and about 23% participate only in group exercise classes with instructor. Annesi et al. (2011) reported large ranges of exercise behavior and program attendance in fitness clubs. They found a range in program attendance spanning 31 to 49 percent when measuring the actual attendance of the program. Annesi (2003) tested for 36 weeks the effect of a multiple component behavior change treatment package. The package included strategies like self-reinforcement, relapse prevention, and contracting. United States, Great Britain, and Italy showed less drop-out (30–39%) and a significantly higher attendance (13–30%) for the treatment group. Seghers et al., (2014) found for a 12-week lifestyle physical activity program significant effects on the effectiveness of physical activity behavior and program adherence. These and other studies (Buckworth et al., 2013; Middelkamp & Steenbergen,

2015) indicate that the maintenance of existing behavior (adherence) and adoption of new exercise behavior is challenging but can be improved by interventions.

Multimedia exercise. An alternative to using personal trainers, group exercise, or self-directed is video-guided exercise (e.g., digital video disk [DVD], internet based, etc.) at home. As evidenced by exercise DVD sales, the popularity of multimedia exercise has grown. Sales of multimedia exercise has increased with an average growth of 11.2% per year from \$155.4 million in 2007 to \$264.5 million in 2012 (Burke, Carron, & Shapcott, 2008; Dunlop & Beauchamp, 2011; Lee et al., 2012). Benefits of using exercise DVDs may include convenience of time, lower cost, and feasible exercise location (Estabrooks, 2000). Multimedia based exercising can also allow the exerciser to select their training intensity. Fraser and Spink (2002) report this may prove to be beneficial because overweight adults are more likely to adhere to exercise when it is self-selected and unsupervised compared with prescribed and supervised exercise. Despite the known benefits of being physically active and the growth of the exercise market, the effectiveness of multimedia-guided training on exercise and personality is still unknown.

Self-directed exercise. Regarding self-directed exercise, individuals who can regulate their own physical activity behavior can execute different options to exercise such as walking, running, and weight training. These individuals have a much greater freedom to adopt and maintain exercise habits to improve their health. They can visualize their desired outcomes and match the physical activity or exercise that is perceived as the best match towards that outcome. The importance of outcome expectancies initiates self-directed exercise. Annesi (2012) stated that when individuals set their own physical

activity goals based on desired outcomes (i.e., weight loss), it will help them to execute this specific kind of behavior. Goal intentions need to be specific and structured to be effective to guide behavior, but do not automatically activate behavior (Bandura, 1997). Specific, attainable, and clear exercise goals produce higher levels of outcomes than general intentions (Bandura, 1997). Exercise goals should be realistic, meaning that exercise goal challenge should not be too difficult, and not too easy and accepted by the individual (Molanorouzi et al., 2015). Goal proximity is another factor that should be considered with an individual's personality. Proximal goals relate to conscientious individuals and are more effective than distal goals that relate more to open to experience people. By creating sub-goals, distal exercise goals can be made more effective for conscientious people that enhance efficacy beliefs and provide rewards for mastery. New exercisers need to understand how their personality influences their exercise selection choice and how this will help them manage and develop skills in an optimal way. Middelkamp and Steenbergen (2015) stated that a review of 33 studies on exercise behavior of fitness club members only four of those addressed self-directed. Thus, it seems that the effects of self-directed exercise choice need further investigation.

Review and Synthesis

While previous researchers have done an adequate job of discussing living a healthy lifestyle through exercise (Centers for Disease Control and Prevention, 2017; Graham, 2012; Haskel et al., 2007) using personality as a predictor variable (Lee & Laffrey, 2008), concluding outcomes of exercise attendance (Lit et al., 2002), behavior maintenance (King et al., 1996), and exercise adherence with preference (Oman & King,

1998), there has been little research completed looking at exercise modality preference in regards to how exercise is actually prescribed. Oman and King (1996) state that health promoters should look at tailoring exercise programs to match individual preferences through personality. The previous conclusion leads to the variable in this research study of personality predicting exercise modality preference. It is possible that if an individual does not use personality to choose exercise modality preference, then he or she may become one of the 60% of adults who are sedentary (Pescatello, 2001).

Previous researchers have also analyzed the personality traits of the FFM predicting exercise behaviors (Connor & Abraham, 2001), such as participation, frequency and performance (Lewis & Sutton, 2011), intention (Connor, Rogers, & Murray, 2007), and motives (Ingledeew & Markland, 2008); however, little research has been done on predicting exercise modality preference, and it is outdated. Although Courneya and Hellsten (1998) did some research on exercise preference, it was analyzing several variables including exercise behaviors, exercise motives, exercise barriers, and exercise preferences. They found that preference for group exercise was correlated with extroversion using a MANOVA; however, did not make a prediction of exercise modality preference based on all of the personality traits in the FFM. Courneya and Hellsten (1998) stated the most interesting topic for future research is examining the relationship between personality and exercise preferences. Predicting exercise modality preference would be a logical step forward from the research of Courneya and Hellsten (1998) with their work on individual preferences.

There are also contradictions in different studies that have been presented. According to Rhodes and Smith (2006), only the personality traits of extroversion, neuroticism, and conscientiousness are correlated with physical activity; however, research shows that openness and agreeableness have been related to exercise behaviors (Hausenblas & Giacobbi, 2004; Ingledew & Markland, 2008; Lewis & Sutton, 2001). It has been demonstrated that all the personality traits have been correlated to exercise behaviors in one form or another; therefore, all of the personality traits should be examined when predicting any type of exercise behavior.

Summary and Conclusions

Evidence shows that living a healthy lifestyle is extremely important in our daily lives (Groven & Engelsrun, 2010; Harvey et al., 2013; Panwar et al., 2015), and crucial in living a healthy lifestyle (Graber et al., 2011; Graham, 2012; Pedersen & Saltin, 2015). Researchers have found two factors that are important when analyzing exercise behaviors: biopsychosocial mechanisms (Dishman & Buckworth, 1996; Lee & Laffery, 2008; Litt et al., 2002; Ling et al., 2008) and the personality traits in the Big-5, including openness, conscientiousness, extroversion, agreeableness, and neuroticism (Litchfield et al., 2012; Parks-Leduc et al., 2015; Wilson & Dishman, 2015). It has been agreed that the biopsychosocial model is positively correlated and an important predictor of exercise behavior (McAuley & Blissmer, 2000; Slovinec D'Angelo et al., 2014) and exercise preference (Lin et al., 2013; Oman & King, 1998), suggesting that personality plays a role in exercise format, such as exercising alone or in a group. Research also shows that

the preferred model to use when using personality traits as a predictor is the Big-5 (Cooper et al., 2013; Goldberg, 1990; McCrae & Costa, 2008).

There is an abundance of evidence that the personality traits in the Big-5 are predictors of physical activity and exercise (Allen & Laborde, 2014; Bogg et al., 2008; Booth-Kewley & Vickers, 1994; Connor & Abraham, 2001; De Groot et al., 2009; Lin et al., 2007; McCann, 2005; Wilson & Dishman, 2015; Yu et al., 2014;). Individuals with low levels of extroversion, conscientiousness, and openness, and high levels of neuroticism predict greater time leisure time sitting time (Ebstrup et al., 2013); whereas, high levels of extroversion and conscientiousness, with low levels of neuroticism, predict high levels of physical activity (Rhodes & Smith, 2006). Although there is less support for openness and agreeableness as predictors of exercise behavior, there is ample evidence that these traits are able to predict exercise behaviors (Hausenblas & Giacobbi, 2004; Ingledew & Markland, 2008; Ingledew, Markland, & Sheppard, 2004; McCann, 2005; Wilson & Dishman, 2015). There have also been meta-analyses completed that show that personality traits are correlated with exercise behaviors (Rhodes & Smith, 2006; Wilson & Dishman, 2015). Finally, both biopsychosocial factors and the personality traits in the Big-5 have been used together when researching exercise behaviors (Bandura, 1997; Lee & Klien, 2002; McAuley et al., 2003; McCrae & Costa, 1999) and researching preferences for exercise behaviors (Hall et al., 2014; Oman & King, 1998).

It is evident, from the studies reviewed in this chapter, there has been a great deal of research completed for living a healthy lifestyle through exercise using the personality

traits of the Big-5 as predictors. Although there is a diverse range of topics relating to exercise and the personality traits that predict exercise behaviors, there is limited research related to preference, especially preference for exercise modality. Because of the lack of research in this area, it was beneficial to explore how the personality traits of the Big-5 can predict exercise modality preference.

Chapter 2 included a review of relevant peer-reviewed literature published within the last five years, as well as seminal literature. This review established the current gap in the relevant literature that this researcher aims to fill with this study. As such, Chapter 3 pertains to the relevant information related to the research methodology, including research design, sampling and population, measures and surveys, data collection, analysis of data, research questions, hypotheses, and expected findings.

Chapter 3: Research Method

Introduction

The purpose of the present study was to determine whether personality, as determined by the Big-5 personality traits, is associated with commitment to one of four common exercise modalities (personal training, group exercise, multimedia exercise, and self-directed), and whether demographic factors moderate the relationships. The adoption of regular physical activity is an important priority for public health advocates because of the documented health benefits of physical activity and the less than optimal participation rates (Troiano et al., 2008). Low participation is a problem that can be alleviated by changing an individual's daily habits, researchers have found. One method of improving health is by adding exercise to an individual's daily activities (Bruijn et al., 2014). An important part of starting an exercise regimen is picking an appropriate training modality for the individual. Health-related research allows important insights into the potential role of personality in health behaviors (Schultz & Schultz, 2016). Because of the less than optimal participation rates in exercise, examining exercise health behaviors to determine successful interventions is important (Hall et al., 2014).

Within this context, the role of personality as a determinant of the decision-preferred exercise modality is an important area of inquiry. To help alleviate an increasing number of health problems associated with physical activity, it is necessary to examine the underlying personality factors that influence health behaviors and how understanding these factors can help individuals live a healthier lifestyle through exercise. Chapter 3 contains an explanation of the research design and appropriateness

and a thorough overview of the study's methodology including the sampling, instrumentation, data cleaning, and analytical procedures. I also describe the ethical considerations pertinent to these procedures before summarizing the key points.

Research Design and Rationale

I used a nonexperimental quantitative, cross-sectional research design, specifically a descriptive design in this study. Use of this design allowed me to compare findings between several demographic features of the sample. Through this methodology, I identified the way individuals of different genders, ages, and personality types compare in terms of their preferred exercise modality. Quantitative research allows researchers to collect large amounts of data and report the data in a concise manner (Patton, 2002). Quantitative research has a prespecified focus (Leedy & Ormrod, 2010) and is a useful way for researchers to reduce the data collected into predetermined response categories by using standardized measures (Patton, 2002). Using descriptive research, researchers examine a situation as it is and do not manipulate an event (Nassaji, 2015). I employed a nonexperimental quantitative, cross-sectional research design in line with many other similar studies (e.g., Lai et al., 2013; Oman & King, 1998; Yu et al., 2014).

I used a predictive approach to investigate whether personality traits using the BFI-10 for the Big-5 can predict an exercise training modality. This finding allowed for examination of whether the Big-5 personality traits are related to how an individual adheres to his or her chosen exercise training modality. The Big-5 personality traits, including openness, conscientiousness, extroversion, agreeableness, and neuroticism, were the focus of examination to determine whether this prediction could be validated.

One potential benefit to being able to predict the appropriate exercise training modality is that this prediction may aid in an individual's ability to choose the right exercise for adherence (Ling et al., 2008). An important part of starting an exercise regimen is selecting an appropriate training modality for the individual. Health-related research allows important insights into the potential role of personality in health behaviors (Schultz & Schultz, 2016). Because of the less than optimal participation rates in exercise, examining exercise health behaviors to determine successful interventions is important (Hall et al., 2014).

I collected data from surveys that were administered on Survey Monkey (www.surveymonkey.com). Survey Monkey is a survey administration platform used to host surveys and compile the resulting data into a pre-organized dataset. A researcher acquires information through surveys by asking questions to a group of people to gain insight about their characteristics, opinions, attributes, and previous experiences (Leedy & Ormrod, 2010). Using the Internet to complete surveys is cost effective (Kraut et al., 2004) and yields data comparable with face-to-face interviews (Gosling, Vazire, Srivastava, & John, 2004). However, there were limitations stemming from my use of Internet surveys in this study. One limitation was that no person was present to monitor participants' completion of surveys. Participants could have rushed through the survey quickly. Another limitation was that participants may not have been honest, though this is a common possibility in self-reports, and is not amendable.

Methodology

Target Population and Participant Selection

I gathered participants from Survey Monkey Audience, which has a diverse target population of more than 30 million people who have agreed to complete surveys on www.surveymonkey.com every month (SurveyMonkey.com). The only inclusion criteria for participation in this study were age (i.e., 25–65) and amount of exercise (i.e., at least twice a week). Surveying all who met these criteria and agreed to participate allowed for the most comprehensive sample. Survey Monkey allows specific criteria to be chosen before surveying, meaning that only those who met the specified criteria for this study were invited to participate. After the individuals become part of SurveyMonkey Audience, they complete a detailed profile survey to collect information (SurveyMonkey.com). This is the method Survey Monkey uses to target a specific group of respondents for each survey as requested by investigators, and is completed through SurveyMonkey alone. The use of this sampling procedure meant that the study criteria did not need to be checked during recruitment, though demographic surveying did ensure that all who responded met the necessary criteria. The participants in this research study were targeted by demographic questions in their initial profile, which included age, gender, and exercise frequency.

Sampling and Sampling Procedures

The type of sampling used was purposive sampling. Purposive sampling is a method of sample in which people are chosen based on their applicability to the study, it and corresponds with less of a focus on the generalizability to a specific population

(Leedy & Ormrod, 2010). I chose purposive sample because a unique set of requirements were needed to answer the research questions. According to Graber et al. (2001), to live a healthy lifestyle, an individual must exercise at least two times a week. For this reason, this amount of exercise activity was a criterion for study participation.

Statistical power in a logistic regression depends on factors such as strength of the association between each predictor variable, degree of assumption violations, and the size and sign of correlations among predictor variables; therefore, recommendations for sample size are difficult to provide (Warner, 2008). However, according to Warner (2008) and Vittinghoff and McCulloch (2007), a multinomial logistic regression should have at least 10 times the number of independent variables in the study. This study had five independent variables; therefore, when I performed a power calculation for moderation, the sample size for this experiment needed to be at least 50 participants. However, moderation analyses can require larger sample sizes if the effect of moderation is small (Baron & Kenny, 1986). I attempted to recruit 350 participants to assure enough power to detect moderations, even if those effects happened to be small.

Procedures for Recruitment, Participation, and Data Collection

Survey Monkey's Audience function distributed the surveys based on age inclusion criteria, which in a part of the participant profile that Survey Monkey already has for each potential participant. As a first step of prospective participation, respondents answered a question about their exercise frequency (at least twice a week) and a question about duration of exercise (at least 6 months). If they were eligible based on these questions, they were asked to continue. If they were not, they were thanked for their

participation and were not allowed to continue. Each eligible participant was then directed to the informed consent to ensure that the participant had a complete understanding of the study. The informed consent form included information on the study procedures and participant rights, along with my contact information in the event that participants had questions. By selecting the option, *I consent to participate in this research*, participants indicated their agreement to be a part of the study and were allowed to move to the next portion of the survey. Each individual had to check a box agreeing that they read the informed consent and that they wished to participate in the study before moving forward. If a participant did not want to participate, they did not have to volunteer and if the participant decided to end participation early, they did not have to finish the questionnaire or survey. I did not coerce participants in any way to participate. Those who consented to participate were administered the questionnaire and the BFI-10. Participants were able to take the surveys on any electronic device that supported Survey Monkey's website. The participants were completely anonymous, as I selected to disable IP address tracking through Survey Monkey's options settings.

The entire survey took less than five minutes for most individuals to complete; this degree of convenience for the participant was a point of consideration when choosing the shortened BFI-10. The participants received thank you messages for their participation.

Instrumentation and Operationalization of Constructs

I collected the participant's exercise and demographic information, including age, gender, and exercise frequency using a survey asking for age, gender, income, and

race/ethnicity. The exercise modality preference was gathered using a 4-item questionnaire, which I designed with the intention of determining one single preferred modality. Because this portion of the survey did not measure a psychometric trait, it was not subjected to the same rigorous validity testing as the BFI-10. In addition, test-retest reliability and internal consistency were not available because of the nature of these questions and surveying procedures (i.e., participants were surveyed in a cross-sectional fashion, and each participant could only select one categorical response). Questions on this survey asked the participants to determine their preferred modality of exercise. Questions included, (a) Do you prefer to exercise alone?; (b) Do you prefer to exercise in a group?; (c) Do you prefer to use technology such as the internet, DVD, or device (smart phone, tablet, or laptop) to exercise?; and (d) Do you prefer to use a personal trainer to exercise?

I explained each exercise modality clearly and asked participants to select the one that best described their primary form of exercise. Participants were only able to choose one modality, which represented their preferred modality. In my professional experience as a fitness facility owner and personal trainer during the last 15 years, I have found that people predominantly use only one exercise modality and are able to verbalize preference for one modality. The validity of this survey was tested during analysis, and the multinomial logistic regression provided evidence to the predictive validity if found to significantly predict the exercise modality.

I administered the Big Five Inventory (BFI-10). I chose to use the BFI-10 because the research required a short and psychometrically sound instrument that can be used in

training facilities to quickly identify the personality type to match to modality type. This 10-item scale was developed to determine the Big-5 personality traits of openness, conscientiousness, extroversion, agreeableness, and neuroticism (Rammstedt & Oliver, 2007). Neuroticism in this study was a measure of predisposition to interpret various exercise stimuli as threatening, or possibility to experience negative emotions towards exercise. Extraversion is a measure of devotion to reward seeking and foraging behaviors. Conscientiousness is a measure of goal or plan orientation, as well as dutiful, orderly implementation of physical activity plans. Openness to new experience is a measure of proclivity for new exercise experiences, and curiosity about different physical activities. Agreeable is a measure of several lower-order traits, consisting of honesty, altruism, trust, compliance, and interpersonal harmony; those with lower scores on this scale may be egocentric, competitive, or skeptical, while those with higher scores may be more trusting and compliant with a personal trainer.

The 10 questions on this scale are rated from 1 (*strongly disagree*) to 5 (*strongly agree*) and can be completed in approximately five minutes. The short version is used to cut down on the amount of time needed to participate in the study. Individuals are more likely to participate in a short study, and this study has been tested against the validity of the long form version of the BFI among two diverse populations of students in both the United States and Germany (i.e., two separate samples were collected for each population). The first U.S. sample consisted of 726 students at a large university, while the second consisted of 726 students at a private university. A third U.S. sample consisted of self-rating and a rating from a close friend, which confirmed external validity. The first

German sample consisted of 457 students, while the second consisted of 376 students (Rammstedt & John, 2007).

An example of the questions on the BFI-10 are, “I see myself as someone who is talkative” and “I see myself as someone who is full of energy.” The test re-test reliability was good with the alpha coefficient .72 in the United States and .78 in Germany. In addition, the internal consistency on the five traits are extroversion .89, agreeableness .74, conscientiousness .82, neuroticism .87, and openness .79 on average between the U.S. and German samples (Rammstedt & John, 2007). The inter-correlations of the five traits average .11, which shows excellent discriminate validity. The Big Five Inventory (BFI-10) is easily obtained online, and is available for public use for research purposes after completing a brief survey on the Berkley website.

Data Analysis Plan

I collected the data through Survey Monkey and stored it on a personal computer that is double password protected. The software used to calculate the descriptive statistic was IBM SPSS Version 23 graduate pack (IBM, 2015). The data obtained from Survey Monkey were exported to the SPSS program. Researchers must examine and organize the data while preparing the data for analysis (Howell, 2008). When entering data into this software program, I took significant caution to ensure the accuracy of data input. It is important that the data are entered correctly. Having even one mistake could lead to errors in the calculations.

To ensure that participants were properly vetted and confirmed to be applicable to the study, I used SurveyMonkey Audience to select applicable participants and those who

SurveyMonkey identified as meeting the criteria were asked follow-up questions to confirm their eligibility before they were able to continue to the survey. In addition, participants with extreme outliers or a prohibitively large amount of missing data were removed. Outliers are identified as those with a z score with a magnitude of 3.29 or greater (Stevens, 2016). Participants who did not reply to any of the questions on one or more of the BFI-10 scales were also removed based on the inability to measure their BFI-10 personality scores.

The research questions and hypotheses were, as follows:

RQ1: Are there differences in type of exercise used (personal training, group exercise, multimedia, and self-directed) by individuals aged 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10?

H_01 : There will be no significant differences in type of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

H_a1 : There will be significant differences in types of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

RQ2: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by gender?

H_02 : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by gender.

H_{a2} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by gender.

RQ3: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by age?

H_{03} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by age.

H_{a3} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by age.

To examine the strength of personality traits and how they predict the exercise modality preference, I used a default multinomial logistic regression. According to Warner (2008), a logistic regression is used when one wants to predict (Y) from (X) with a dichotomous outcome variable. The mathematical concept behind logistic regression is the logit or the natural logarithm of an odds ratio (Peng, 2002). The odds ratio was the main parameter of interest and described the odds that variable A (dependent variable) occurs relative to variable B (independent variable) occurring. I predicted the dichotomous outcome variable (exercise modality preference) from the five independent variables (openness, conscientiousness, extroversion, agreeableness, and neuroticism). The relationship between the five independent variables can be graphed as sigmoidal and is not linear. Logistic regression handles nonlinear relationships because logistic regression applies nonlinear log transformation to linear regression (Park, 2013). When presenting the logistic regression results, four types of information, including overall

evaluation of the model, statistical tests of individual predictors, goodness-of fit statistics, and the assessment of the predicted probabilities (Park, 2013).

The overall fit of a model shows the strength of the relationship between the independent and dependent variables. Archer and Lemeshow (2006) stated that a goodness of fit model must be completed to test the overall departure from the observed data. The relationship between the five independent variables and the dependent variable needs to be tested using a chi-square value. A significant value between these variables improves the ability to predict the dependent variable more accurately. I used a Wald chi-square statistic to find out what predictor variables are statistically significant to the prediction of exercise modality preference (Warner, 2008).

According to Warner (2008), the assumptions of logistic regression are as follows: (a) The outcome variable is dichotomous, coded 1 or 0; (b) The outcome variable scores must be statistically independent of each other; (c) The model must include all relevant variables and exclude any irrelevant predictors; and (d) The outcome variable must be exhaustive and mutually exclusive to one group.

Descriptive statistics are also presented from the demographic information, including age range, gender, income range, and geographic location. Descriptive statistics are used when trying to describe a set of data (Howell, 2008). The use of descriptive statistics was important to understand the generalizability of the study, but also in terms of the ability to control for the confounding effects of these demographic variables. In terms of confounding effects, age and gender may influence the choice of exercise, while income and geographic location may limit the available forms of exercise in which the

sample participates. Further, personality traits may differ based on gender. By controlling for these potential influences, any relationship between personality and exercise is likely to be statistically supportable, and less likely to be attributed to the influence of sample bias (Stevens, 2016).

Threats to Validity

I first ensured the validity of the study by using Cronbach's alpha estimates to determine internal consistency for each subscale of the BFI-10. The acceptable level of internal consistency is .70, which indicates items tightly connected to the scale. The results of a study hold content validity when the measurement instrument covers all the attributes extracted from the findings. Content validity includes both face validity and sampling validity. Rigorous establishment of pre-existing content validity measures ensures content validity for the survey design and evaluation to capture all the elements under study (Frankfort-Nachmias & Nachmias, 2007). The survey instrument consists of questions that measure personality trait and exercise modality (Frankfort-Nachmias & Nachmias, 2007). These instruments are similar in purpose as a measuring tool but different in the extraction of the data for statistical evaluation and interpretation of the data.

I used the basics of validity, which are content, empirical, and construct, and are unique values under specific conditions. Reliability evaluates the measuring instrument regarding the characteristics used to define testing methods in the relationship between reliability and validity that complement one another (Frankfort-Nachmias & Nachmias, 2007). According to Köksal, Ertekin, and Çolakoğlu (2014), measuring usage are

important factors in threatening internal validity in research even when the same scale is a different study. Depending on the Likert-type scale, training the collected scores may change the reliability and validity with a different application (Köksal et al., 2014); thus, it is important to reassess the reliability for the final sample in this study. I accomplished this using Cronbach's alpha values.

The main concern regarding external validity in this study was the ability to generalize findings to similar populations. Though there is no way to be sure that the study's findings are entirely applicable to similar populations outside of secondary research, I intentionally targeted a sample with similar characteristics to the population at large. In reaching this target sample, Survey Monkey distributed the surveys based on the age inclusion criterion of 25 to 65 years old, which is a pre-existing criterion on the survey platform. As a first step in participation, respondents answered a question about their exercise frequency (at least twice a week) and duration of exercise (at least six months), which was the secondary inclusion criteria. This sampling strategy helped to contribute to the external validity, in that results should be applicable to a population of 25 to 65-year-old adults who exercise at least twice a week, and have kept up such a lifestyle for at least six months. In addition to these descriptive features, the survey included questions regarding several demographic features, which I used as control variables.

Ethical Considerations

Research must be conducted using ethical considerations. It is imperative that one use a set of guidelines to ensure the participant safety. In most cases, the IRB board is

used to ensure that all ethical considerations are handled appropriately before the study begins and during the study to handle any complications that may occur (Connelly, 2014). Being able to anticipate and address any issue that may arise is essential. The IRB board also requires informed consent for anyone that is participating in a study. The Ethical Principles of Psychologists and Code of Conduct (2010) has a section related to informed consent.

In informed consent, psychologists inform participants about (a) The purpose of the research, expected duration and procedures; (b) Their right to decline to participate and to withdraw from the research once participation has begun; (c) The foreseeable consequences of declining or withdrawing; (d) Reasonably foreseeable factors that may be expected to influence their willingness to participate such as potential risks, discomfort, or adverse effects; (e) Any prospective research benefits; (f) Limits of confidentiality; (g) Incentives for participation; and (h) Whom to contact for questions about the research and research participants' rights (The Ethical Principles of Psychologist's and Code of Conduct, 2010). Participation was entirely voluntary and anonymous; participants who received the recruitment materials were already part of a group who agreed to receive invitations through SurveyMonkey, and were not expected to feel coerced or required to participate in any way. Participants were not required to answer all questions, and could leave the study at any time, as outlined in the informed consent form. In addition, identifying features, such as IP address, name, and contact information, were not collected to reinforce the anonymous nature of data collection.

Data will be retained for a period of 7 years following completion of the study, after which it will be destroyed by permanent deletion.

General Precautions

The safety of each participant and their records was carefully considered when conducting this research study. I submitted an application to Walden's IRB to ensure that all precautions were taken before the study began and during the data collection. The IRB approval number for this study is 12-11-17-0056116. The data were collected through the Survey Monkey website. Survey Monkey's data are secured by using Secure Sockets Layer (SSL), which creates a secure connection between a participant and a server, encrypting sensitive information transmitted through the web page. The participants' IP address tracking was disabled; therefore, the participants were completely anonymous. There was no way to link the participant with the data collected; as such, data collection are entirely anonymous (i.e., IP addresses, contact information, names, and other identifying features were not collected), and thus breaches of security were not a problem. I will keep the data on a personal computer that is double password protected for 7 years as required by Walden University. Participants received an informed consent before they started the study and were required to check a box agreeing that they have read the informed consent and that they wished to participate before moving forward. There were no foreseen dangers to any participants because of the nature of the study.

Summary

The primary research question for this study was, Are there differences in type of exercise used (personal training, group exercise, multimedia, and self-directed) by

individuals, ages 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic or Open to Experience? The null hypothesis was that there will be no significant differences in type of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10. I expected that the full model with the five independent variables would be able to predict exercise modality preference better as compared to a model without the predictor variables. These predictions are made based on the ability that the Big-5 personality traits will predict exercise modality preference. To test the hypotheses, I chose a nonexperimental quantitative, cross-sectional research design with an emphasis on descriptive findings.

The second research question for this study was, Do the differences by personality trait vary by gender? I expected that the personality traits of the Big-5 personality traits would vary by gender. Specifically, women will prefer exercising in a group, while men will prefer exercising alone. These predictions were made for the following reasons:

Men tend to think in more concrete terms and not abstract terms. They tend to be nonconforming. They may do better exercising by themselves so that they can create an exercise plan that would be best for them in their mind. They would most likely do well exercising alone so that they can have a planned and organized workout without interruption (John et al., 2008).

Women tend to have a need for social interaction (John et al., 2008). They are assertive, full of energy, and adventurous. Women are the most likely to exercise in a group because of being social in nature. They are warm and affectionate (John et al.,

2008). They tend to be trusting and altruistic. They value social harmony and get along with others well. Women are more likely to exercise in a group because they get along with others well.

The third research question was, Do the differences by personality trait vary by age? I expected that when the data is analyzed that one will be able to conclude that age is able to predict exercise modality preference. Age is a direct and indirect predictor of human behavior. Age is also positively correlated and an important predictor of exercise preference (Oman & King, 1998; Lin et al., 2013), suggesting that age plays a role in exercise format, such as exercising alone or in a group. The factors that improve age are mastery of past performances, observing someone of the same competence accomplish a goal, being encouraged by others, and a stable physical and emotional state (Feist & Feist, 2009). Therefore, the belief is that age could predict exercising in a group because of their ability to observe someone of the same competence accomplish a goal and being encouraged by others to exercise. Chapter 4 contains a description of sampling procedures, sample size and power, a demographic description of the sample of participants who were in this study, and information relevant to the analysis.

Chapter 4: Results

Introduction

As the obesity epidemic becomes more problematic in the US, researchers estimate that 29.4% of U.S. adults and 31.3% of children are obese (Holicky & Phillips-Bell, 2016). Exercise reduces the risk of cardiovascular disease, Type 2 diabetes, and obesity (Pedersen & Saltin, 2015), yet 60% of U.S. adults are sedentary most of their life (Harvey et al., 2013). A lack of time, access to exercise facilities and equipment, lack of social support, and other psychosocial and practical barriers may lead to this sedentary lifestyle (Allen & Morey, 2010). However, little research has been conducted regarding the influence that personality traits have on exercise preferences and maintenance. In conducting this study, I sought to address this gap in research to help individuals and health providers better understand the relationship between personality and exercise factors to achieve healthy lifestyles. The research questions and hypotheses were, as follows:

RQ1: Are there differences in type of exercise used (personal training, group exercise, multimedia, and self-directed) by individuals, ages 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10?

H_01 : There will be no significant differences in type of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

H_{a1} : There will be significant differences in types of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

RQ2: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by gender?

H_02 : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by gender.

H_{a2} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by gender.

RQ3: Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by age?

H_03 : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by age.

H_{a3} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by age.

Chapter 4 begins with a description of the initial sample, as well as discussion of the final sample following data cleaning procedures. The chapter's organization follows with tabulation of these variables' descriptive statistics, and a subsequent explanation of the hypothesis test findings. The analyses to test the study hypotheses follow three sections, with one for each research question. The chapter closes with a summary of the key points of the results and a transition to Chapter 5.

Data Collection

Data collection took place using SurveyMonkey's Audience service, and followed the original data collection plan. The data collection window began on December 11th, 2017, and closed December 12th, 2017. A total of 798 respondents volunteered for the study and completed the first page, which assessed eligibility. Respondents constituted a geographically diverse sample of the United States. However, as seen in Figure 1, Western states may not be as well represented as the Northeast, Mid-Atlantic, Southeast, or Great lakes regions.



Figure 1. Response map from SurveyMonkey.

Of the 798 respondents, 29 did not provide consent and had to be removed. A further 466 were not eligible for the study, either because they did not provide information regarding their exercise frequency or did not exercise at least twice a week ($n = 366$); did not provide any information regarding the length of time they had been

exercising or had not been exercising for at least 6 months ($n = 95$); or did not report their age, or were outside of the eligible age range of 25 to 65 ($n = 5$). Of the remaining 303 respondents, 104 were missing too many responses for their data to be useful in analysis and were also removed. After removing these 599 inapplicable or unusable responses, the final sample consisted of 199 respondents who completed the survey and met all study criteria. Though this number exceeded the minimum amount necessary to detect significance, it did not meet the goal of 350 that was set to allow smaller effects to be detected using the Baron and Kenny (1986) method of moderation. However, the sample goal of 350 was only intended to increase the power of the analyses to allow for explorations into effects smaller than those expected.

The final sample consisted of similar proportions of males and females, with a slight majority of men ($n = 107$, 53.8%). Most participants were White (75.4%); there were 7.5% Black, 5.5% Asian or Pacific Islanders, 4.5% Hispanic, 2% American Indian or Alaskan Native, and 4.5% multiethnic participants. Within this sample, the mean age was 44.96 ($SD = 11.97$), and participants earned an average household income of \$97,577.62 ($SD = 92,216.35$). Though the mean income of the sample was slightly higher than the average household income in the United States, the standard deviation's relative high value also indicated that a large variety of income levels were sampled. Incomes were also skewed to the left, with many participants having lower incomes and a smaller number with high incomes, which mirrors the U.S. income distribution. Though ages were not entirely representative of the United States, they did offer a good representation

of the age range pertinent to the study (i.e., 25 – 65 years). Means, standard deviations, frequencies, and percentages for descriptive statistics can be found in Table 1.

Table 1

Descriptive Statistics for Demographic Variables

Variable	Min.	Max.	<i>M</i>	<i>SD</i>
Age	25.00	65.00	44.96	11.97
Income	0.00	500,000	97,577.62	92,216.35

Variable	Frequency	%
Gender		
Female	92	46.2
Male	107	53.8
Ethnicity		
American Indian or Alaska Native	4	2.0
Asian or Pacific Islander	11	5.5
Black or African American	15	7.5
Hispanic	9	4.5
White or Caucasian	150	75.4
Multiple ethnicity or other	9	4.5
Missing or no response	1	0.5
Preferred exercise modality		
Alone	149	74.9
Group	33	16.6
Technology assisted	11	5.5
Personal trainer	6	3.0

All 199 participants indicated that they had been exercising for 6 months or more. Of these, 55 (27.6%) exercised twice a week, while the majority ($n = 144$, 72.4%) exercised more than twice a week. Most of the sample preferred to exercise alone ($n = 149$, 74.9%), while 33 (16.6%) preferred to exercise in a group, and 11 (5.5%) preferred to use technology. A very small portion ($n = 6$, 3.0%) preferred a personal trainer.

BFI scores were calculated from the 10 BFI short form items, as outlined in the scoring manual. Reverse scoring was required for Items 1, 3, 4, 5, and 7 to ensure that all

item responses had the same directionality (i.e., higher scores correspond to a greater presence of each of the five personality traits). After reversing these items, scoring consisted of calculating the average score between two items each for extraversion, agreeableness, conscientiousness, neuroticism, and openness. No transformations or data manipulation were necessary for any other variables.

Among the Big-5 personality traits, the highest mean score was 4.08 ($SD = 0.81$), from the conscientiousness scale. The lowest mean score resulted from neuroticism, with an average score of 2.66 ($SD = 1.01$). The remaining mean BFI scores ranged from 3.12 (for extraversion) to 3.59 (for openness). Cronbach's α scores were low, with a highest value of .67, which corresponded with extraversion. However, it is likely that this is a result of the small number of items on each scale, which Stevens (2016) indicated as potentially problematic when calculating these measures of internal consistency. In the report of this short form's validity, the authors did not calculate the modified scale's validity, possibly for this reason. Instead, Rammstedt and John (2007) showed that these short scales had strong correlations with their 9-item counterparts, confirming that though individual measures of internal consistency may vary from study to study, it is reasonable to consider these scales accurate measurements of the Big-5 personality traits. Table 2 contains the full descriptive statistics for these BFI scores.

Table 2

Descriptive Statistics for Continuous BFI Variables

Variable	Min.	Max.	M	SD	Cronbach's α
Extraversion	1.00	5.00	3.12	1.17	.67
Agreeableness	1.00	5.00	3.50	0.94	.23

Conscientiousness	2.00	5.00	4.08	0.81	.34
Neuroticism	1.00	5.00	2.66	1.01	.52
Openness	1.00	5.00	3.59	1.02	.47

Results

Results below correspond to the three research questions of interest to this study. Each of these research questions was tested with multinomial logistic regression. This analysis relies on four major assumptions, including the use of a categorical outcome variable, independence of the outcome variable, inclusion of relevant predictor variables only, and an exhaustive and mutually exclusive outcome variable (LeBlanc & Fitzgerald, 2000). The use of the mutually exclusive categorical response to exercise modality, in which participants were only able to select one preferred modality, ensured that the first and last assumptions were met. Similarly, the categorical data for the preferred modality variable was independent of all other responses, and participants were not able to influence one another's responses in any way, thus meeting the second assumption of multinomial logistic regression. Finally, an exhaustive review of the extant literature on this topic ensured that only relevant variables were included, and as only the Big-5 personality traits, age, and gender were relevant to the study's purpose, no variables outside of these were included in any of the following analyses. This resulted in all four major assumptions being met, and ensured that the multinomial logistic regressions were valid.

Research Question 1

Are there differences in type of exercise used (personal training, group exercise, multimedia, and self-directed) by individuals, ages 25 to 65 years who are categorized as

Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10?

H_01 : There will be no significant differences in type of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

H_{a1} : There will be significant differences in types of exercise used by individuals who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10.

The primary research question pertained to the relationship between the Big-5 personality traits and exercise modality, and as such, only these traits were included in the model. This research question not only provided evidence for the analysis of research questions two and three by indicating that the first step of Baron and Kenny's (1986) moderation analysis held true (i.e., that there is a relationship between an independent and dependent variable that could be subject to a moderating effect), but also allowed for a statistical determination of which of the Big-5 personality traits showed evidence of a predictive relationship with exercise modality preferences, as this would be important in determining which variables to assess for potential moderating effects of age and gender in the following analyses. As the group of participants who preferred the exercise modality using a personal trainer only consisted of six participants, this category was treated as the reference category.

The multinomial logistic regression model resulted in evidence that a logit combination of these personality traits was significantly predictive of the preferred

exercise modality based on the model fitting information, $\chi^2(15) = 33.58, p = .004$. A goodness of fit analysis using Pearson's method of calculation, $\chi^2(570) = 548.56, p = .734$, confirmed that the model was well-specified, and was unlikely to be improved by modifying the predictors in any way. After confirming the model's specification, the parameter estimates were assessed to determine which personality traits were significantly predictive of exercise modality preferences. This stage of the analysis indicated only two significantly predictive personality traits. First, neuroticism was positively associated with a preference for group exercise, Wald = 4.01, $p = .045$, OR = 2.72; each 1-unit increase in neuroticism scores corresponded with a 2.72 factor increase in the odds of preferring a group setting. Conversely, openness had a negative relationship with the use of technology when exercising, Wald = 5.10, $p = .024$, OR = 0.25; each 1-unit increase in openness corresponded with a decrease in likelihood of preferring to use technology by a factor of 4. In addition to these significant findings, the results show that individuals with different levels of extraversion, agreeableness, and conscientiousness all tended to have similar preference for all four modalities. Results showing these two significant relationships are presented in Table 2. Based on these findings, neuroticism and openness were the focus of the following mediation analyses, which would determine whether the effect of neuroticism or openness changed based on participants' age or gender.

Table 3

Multinomial Logistic Regression Results for BFI Scores Predicting Preferred Modality

Category	Predictor	B	Wald	p	O.R.	95% CI	
						Lower	Upper

Exercise alone							
	Intercept	4.77	1.25	.263	-	-	-
	Extraversion	-0.05	0.02	.895	0.95	0.44	2.05
	Agreeableness	-0.85	2.06	.151	0.43	0.14	1.36
	Conscientiousness	0.90	2.69	.101	2.47	0.84	7.26
	Neuroticism	0.42	0.81	.369	1.51	0.61	3.74
	Openness	-0.67	1.51	.219	0.51	0.18	1.49
Group exercise							
	Intercept	-0.17	0.00	.971	-	-	-
	Extraversion	0.55	1.67	.196	1.73	0.75	3.97
	Agreeableness	-0.75	1.46	.227	0.47	0.14	1.60
	Conscientiousness	1.07	3.19	.074	2.91	0.90	9.43
	Neuroticism	1.00	4.01	.045	2.72	1.02	7.21
	Openness	-1.01	3.13	.077	0.36	0.12	1.12
Exercise with technology							
	Intercept	5.24	1.12	.289	-	-	-
	Extraversion	0.11	0.05	.820	1.12	0.43	2.87
	Agreeableness	-0.93	1.88	.170	0.40	0.11	1.49
	Conscientiousness	0.72	1.17	.280	2.05	0.56	7.54
	Neuroticism	0.37	0.40	.527	1.45	0.46	4.53
	Openness	-1.41	5.10	.024	0.25	0.07	0.83

Note. Reference category is the preference for personal trainer.

Research Question 2

Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by gender?

H_{02} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by gender.

H_{a2} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by gender.

To assess Research Question 2, I conducted a multinomial logistic regression using Baron and Kenny's (1986) method of moderation analysis. This regression used the same dependent variable, which included a category for each of the three nonreference preferences for exercise modality. Because of the main assumptions of the multinomial

logistic regression, it was necessary to include only the variables relevant to the analysis. Since the analysis was an assessment of the moderating effect of gender, the gender variable required inclusion. Similarly, because there were only two personality traits significant to the prediction of preferred modality, the moderating effects could only act on these variables' effects. As such, the moderation model for this analysis only included gender, neuroticism, openness, and two interaction terms; the first resulting from the interaction of neuroticism and gender and the second resulting from the interaction of openness and gender. The creation of interaction terms followed the method that Baron and Kenny outlined, beginning with the centering of continuous scores (i.e., openness and neuroticism) and followed by multiplication of these centered scores and the moderating variables. In the resulting model, this analysis included five predictors.

Based on the model fitting information, this multinomial logistic regression model resulted in evidence that a logit combination of these personality traits and moderating effects was significantly predictive of the preferred exercise modality, $\chi^2(15) = 33.38, p = .004$. A goodness of fit analysis using Pearson's method of calculation, $\chi^2(258) = 180.30, p > .999$, confirmed that the model was well-specified, and was unlikely to be improved by modifying the predictors. To meet the requirements of moderation based on Baron and Kenny, the interaction term must be significant; a significant interaction between neuroticism and gender would indicate that the effect of neuroticism differed between men and women. Based on the results, which appear in Table 3, there were no significant predictors in the model after accounting for the interaction effects. These results

suggested no moderating effect of gender on the relationship between neuroticism or openness and preferred exercise modality, and the null hypothesis could not be rejected.

Table 4

Multinomial Logistic Regression Results for Moderating Effect of Gender

Category	Predictor	B	Wald	p	O.R.	95% CI	
						Lower	Upper
Exercise alone							
	Intercept	3.83	0.66	.418	-	-	-
	Neuroticism	0.46	0.21	.645	1.59	0.22	11.33
	Openness	-0.49	0.18	.668	0.61	0.07	5.70
	Neuroticism*Gender	-0.35	0.10	.751	0.70	0.08	6.22
	Openness*Gender	-0.38	0.09	.770	0.68	0.05	8.91
	Gender	0.95	0.52	.471	2.59	0.20	34.49
Group exercise							
	Intercept	2.16	0.20	.655	-	-	-
	Neuroticism	0.79	0.58	.445	2.20	0.29	16.63
	Openness	-0.72	0.39	.532	0.49	0.05	4.69
	Neuroticism*Gender	-0.29	0.06	.802	0.75	0.08	7.41
	Openness*Gender	-0.55	0.16	.686	0.58	0.04	8.19
	Gender	1.10	0.65	.419	3.02	0.21	43.88
Exercise with technology							
	Intercept	4.37	0.70	.403	-	-	-
	Neuroticism	-0.19	0.03	.863	0.83	0.10	6.82
	Openness	-1.48	1.54	.215	0.23	0.02	2.36
	Neuroticism*Gender	2.00	1.66	.198	7.38	0.35	155.18
	Openness*Gender	1.32	0.60	.439	3.73	0.13	104.14
	Gender	3.20	2.69	.101	24.57	0.54	1125.69

Note. Reference category is the preference for personal trainer.

Research Question 3

Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by age?

H_{03} : The differences by personality traits (as calculated from the BFI-10) in the exercises used will not vary by age.

H_{a3}: The differences by personality traits (as calculated from the BFI-10) in the exercises used will vary by age.

To assess Research Question 3, I conducted a second moderation analysis. As with the analysis of gender's moderating effect, it was necessary to include only neuroticism and openness as independent variables. Because the analysis was an assessment of the moderating effect of age, the age variable required inclusion. As with the first moderation, the significant direct effect of neuroticism and openness to the prediction of preferred modality meant that moderating effects could only act on these variables' effects. Thus, the model for this analysis included age, neuroticism, openness, and the two resulting interaction terms. The creation of interaction terms followed the method used in the analysis of gender's moderating effect, which was consistent with the method Baron and Kenny (1986) outlined. The resulting analysis included these five predictors.

Based on the model fitting information, this multinomial logistic regression model resulted in evidence that a logit combination of these personality traits and moderating effects was not significantly predictive of the preferred exercise modality, $\chi^2(15) = 22.65$, $p = .092$. Because the model itself was not significant, the goodness of fit statistics were not meaningful, and did not require testing. To meet the most basic requirements of Baron and Kenny's method for testing moderation, the model with the interaction terms must be significant to justify interpreting the variables within the model. Thus, based on the findings, there was no evidence that age was a significant moderator of the effects of openness or neuroticism on preferred exercise modality, and the null hypothesis could not

be rejected. Table 4 contains the individual predictor variables' results as a confirmation of this outcome.

Table 5

Multinomial Logistic Regression Results for Moderating Effect of Age

Category	Predictor	B	Wald	p	O.R.	95% CI	
						Lower	Upper
Exercise alone							
	Intercept	3.79	0.13	.719	-	-	-
	Age	0.01	0.03	.875	1.01	0.91	1.11
	Neuroticism	0.80	0.24	.625	2.22	0.09	54.10
	Openness	-0.73	0.12	.734	0.48	0.01	33.07
	Neuroticism*Age	-0.01	0.08	.778	0.99	0.93	1.06
	Openness* Age	0.00	0.00	.982	1.00	0.91	1.09
Group exercise							
	Intercept	4.61	0.18	.673	-	-	-
	Age	-0.02	0.14	.711	0.98	0.88	1.09
	Neuroticism	0.55	0.10	.757	1.72	0.06	54.37
	Openness	-0.88	0.15	.699	0.42	0.01	35.18
	Neuroticism*Age	0.01	0.02	.900	1.01	0.93	1.08
	Openness* Age	-0.01	0.01	.925	1.00	0.91	1.10
Exercise with technology							
	Intercept	10.93	0.90	.342	-	-	-
	Age	-0.04	0.53	.467	0.96	0.85	1.08
	Neuroticism	-0.39	0.04	.848	0.68	0.01	37.45
	Openness	-2.03	0.64	.423	0.13	0.00	18.88
	Neuroticism*Age	0.02	0.19	.661	1.02	0.93	1.12
	Openness* Age	0.01	0.06	.814	1.01	0.91	1.13

Note. Reference category is the preference for personal trainer.

Summary

Chapter 4 contained the outcomes associated with Research Questions 1–3. The chapter opens with clarification of the data collection procedures and all data cleaning actions taken on the original data pool, including a description of the final resulting sample. Results of the three analyses provided evidence that individuals age 25 to 65 who exercise at least twice a week and have retained such a habit for more than 6 months and

are categorized as mostly neurotic or open to experience have a preferred method of exercise. Although individuals highest on neuroticism levels tend to be more likely to prefer group exercise, those highest on openness tended to prefer any method of exercise that did not incorporate technology. However, when assessed to determine whether these links between personality traits and exercise preference changed based on an individual's age or gender, results did not provide any evidence to support any such moderating effects. The link between personality trait and exercise preference among those aged 25 to 65 were statistically similar for both men and women, as well as those of any age within the sampling bounds. Chapter 5 includes an assessment of these findings, with discussion of their alignment to the existing literature and possible suggestions for future researchers interested in this topic.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Although the benefits of exercise have received significant attention, the factors related to decision making among individuals have been neglected. Existing research on the role of exercise has primarily focused on what type of exercise people do, rather than on what exercise modality people choose as a reflection of their personality traits (see Rhodes & Pfaeffli, 2012; Van Roie et al., 2015). The purpose of the present study was to determine whether personality, as determined by the Big-5 personality traits, is associated with commitment to one of four common exercise modalities (personal training, group exercise, multimedia exercise, and self-directed), and whether demographic factors moderate the relationships. Chapter 5 includes a discussion of the findings related to this study regarding predicting exercise modality preference using the personality traits of the Big-5. The information includes the hypotheses as well as the implications of the results as they relate to the three research questions. Next, the chapter includes the results of the study in relation to its initial hypotheses and research questions. I also discuss the problems and other elements that influenced the results. The fourth section of Chapter 5 contains a comparison of the findings to the literature and relevant conclusions. The chapter culminates with the limitations, the recommendations for further research, and the conclusion.

A major problem in 21st-century society results from the large proportion of the U.S. population living an unhealthy lifestyle, which leads to many health problems (Phelan et al., 2001); however, this is a problem that can be alleviated by changing an

individual's daily habits. One method of living a healthy lifestyle is to add exercise to an individual's daily activities (Bruijn et al., 2014). An important part of starting an exercise regimen is selecting an appropriate delivery method for the individual. Health-related research offers important insights about the potential role of personality in health behaviors (Marshall et al., 1994). Because of the U.S. population's low participation rates in exercise, examining exercise health behaviors to determine successful interventions is important (Courneya & Hellsten, 1998). Within this context, the role of personality in using the Big-5 as a determinant of participation in the decision-making process of exercise is an important area of inquiry. To help alleviate the increasing number of health problems, it was necessary to investigate the underlying personality factors that influence health behaviors.

In this study, I focused on predicting exercise modality preference by using the personality traits in the Big-5 (e.g., McCrae & Costa, 2008). The participants were selected from the SurveyMonkey Audience via www.surveymonkey.com. During the course of this study, in 2018, SurveyMonkey Audience had a diverse population of more than 30 million people ready and willing to complete surveys on their website every month (<http://www.surveymonkey.com>). The sample for the present study consisted of men and women between the ages of 25 and 65 who exercised at least two times a week for 6 months or more. Those participants who did not exercise two times a week for 6 months or more were excluded through an eligibility survey they completed as a first step to participation. I used a nonexperimental quantitative research design, specifically a descriptive design, in this study. The data from the BFI-10 and the modality preference

questionnaire for personal training, group exercise, multimedia, and self-directed were analyzed using a multinomial logistic regression to investigate the strength of personality traits and how they predicted the exercise modality preference.

The hypothesis of Research Question 1 was that exercise modality preference could be predicted by the personality traits in the Big-5; this hypothesis was supported. The personality trait neuroticism predicted a preference for group exercise training while openness predicted a nonpreference for the use of technology when exercising. The traits conscientiousness, agreeableness, and extraversion all tended to have no specific preference for any of the four modalities.

The hypothesis of Research Question 2 was that gender is a moderator of personality's effect on exercise modality preference. No relationship between gender and exercise modality preference was found, nor was gender found to be a moderator for the effect of personality. As such, the null hypothesis was retained.

The hypothesis of Research Question 3 was that age would be a moderator for the effect of BFI on exercise modality preference. I expected that participants between the ages of 25 and 40 to have the strongest predictors of exercise modality preference. However, age was not a significant predictor of exercise modality preference nor was it a moderator of the effect of BFI traits on preferred modality. As a result, even though neither age nor gender had a moderating effect on modality preference, where an individual fell within the Big-5 personality traits did have an effect on preferred modality.

Interpretation of the Findings

The primary research question for this study was, Are there differences in type of

exercise used (personal training, group exercise, multimedia, and self-directed) by individuals, ages 25 to 65 years who are categorized as Agreeable, Extroverted, Conscientious, Neurotic, or Open to Experience based on the BFI-10? I performed a multinomial logistic regression analysis to predict exercise modality preference and, from the Big-5 personality traits, found that the null hypothesis should be rejected. The analysis showed that openness, conscientiousness, extroversion, agreeableness, and neuroticism can predict exercise training preference significantly better than predictions of exercise modality preference being made without these five variables. The following is a discussion of the results for each subquestion involving the five personality traits in the Big-5.

The first subquestion of Research Question 1 was, Does openness predict exercise modality preference? I expected that openness would predict exercising alone because of the tendency for those high in openness to be nonconforming (John et al., 2008). I performed a multinomial logistic regression analysis to predict exercise modality preference from the Big-5 personality traits. Based on findings, the null hypothesis was rejected. Exercise modality preference can, thus, be predicted from the Big-5 personality trait openness. This was not an expected finding because of the personal tendencies of an individual who is high in openness. However, I was able to predict that these individuals have a negative relationship with regards to the use of technology during exercise. This finding suggests that placing these individuals in programs that incorporate one-on-one training, group, or self-directed exercise would be the best approach for the most successful outcome and compliance.

The second subquestion of Research Question 1 was, Does the personality trait conscientiousness predict exercise modality preference? The expected finding was that conscientiousness would predict preference to exercising alone because individuals high in conscientiousness have been found to prefer planned and organized behavior as opposed to spontaneity (John et al., 2008). Because of the lack of significance for the conscientiousness variable, exercise modality preference could not be predicted from the Big-5 personality trait conscientiousness, and those with different levels of conscientiousness tended to have a similar preference for all four modalities. This finding suggests that individuals who score high in conscientiousness can participate or be placed in any of the four modalities and have a high likelihood of success and compliance.

The third subquestion of Research Question 1 was, Does the personality trait extroversion predict exercise modality preference? The expected finding was that extroversion would predict exercise modality preference, specifically preference for exercising in a group. Individuals high in extroversion are typically social people who are full of energy and adventurous (John et al., 2008). Those higher in extroversion have more social relationships and more social support (Berkman et al., 2000). These individuals are also more likely to be in situations that make them more physically active (DeGroot et al., 2009). All of these factors support the idea that extroversion would predict preference for exercising in a group. However, results from tests of the individual predictors in the model did not result in evidence for the predictive effect of extroversion, and those with different levels of extraversion tended to have a similar preference for all four modalities. This finding suggests that individuals who score high in extroversion can

participate or be placed in any of the four modalities and have a high likelihood of success and compliance.

The fourth subquestion of Research Question 1 was, Does the personality trait agreeableness predict exercise modality preference? The expected finding was that agreeableness would predict preference for exercising in a group because an individual high in agreeableness values social harmony and the ability to get along with others (John et al., 2008). Counter to this expectation, agreeableness was not a predictor of preference for group exercise. Exercise modality preference cannot be predicted from the Big-5 personality trait agreeableness, as those with different levels of agreeableness tended to have a similar preference for all four modalities. This finding suggests that individuals who score high in agreeableness can participate or be placed in any of the four modalities and have a high likely hood of success and compliance.

The fifth subquestion of Research Question 1 was, Does the personality trait neuroticism predict exercise modality preference? The expected finding was that neuroticism would be a predictor of preference for exercising alone because an individual high in neuroticism is emotionally reactive, irritable, and hostile (John et al., 2008). Counter to this expectation, neuroticism was not a predictor of preference to exercising alone. I performed a multinomial logistic regression analysis to predict exercise modality preference from the Big-5 personality traits and found that the null hypothesis must be rejected. Exercise training preference can be predicted from the Big-5 personality trait neuroticism, specifically preference for group exercise, as those with high neuroticism tended to prefer a group setting. For the sample and a larger population size, we can

conclude that neurotic individuals prefer the accompaniment of other individuals to be successful with exercise. Future researchers should explore the reasoning for this preference, possibly through qualitative methodology.

Research Question 2 was, Do the differences by personality trait (as calculated from the BFI-10) in the exercises used vary by gender? The expected finding was that gender would be a predictor of group exercise modality preference, specifically for women, and it was expected that men would prefer to exercise alone because women tend to score more in the traits associated with group activity and men score more in the traits that prefer to be alone (Furnham & Tsoi, 2012). I performed a multinomial logistic regression analysis to predict exercise modality preference from the Big-5 personality traits and found that the null hypothesis failed to be rejected. Exercise modality preference could not be predicted from gender in this sample. This finding suggests that there is no difference by gender for exercise modality preference. In the literature, gender is positively correlated to exercise, and it is an important predictor of exercise behavior (McAuley & Blissmer, 2000; Slovinec D'Angelo et al., 2014) and exercise preference (Lin et al., 2013; Oman & King, 1998). The finding in the present study suggest that gender does not predict the exercise modality preference, possibly because of Bandura's (2002) suggestion that subjects, such as exercise modalities, are valued as personal choices. According to my findings, individuals enjoy any and all of the exercise modalities regardless of their gender, as neither men nor women had higher tendencies for inclusion in any of the four exercise modalities tested.

Research Question 3 was, Do the differences by personality trait (as calculated

from the BFI-10) in the exercises used vary by age? I performed a multinomial logistic regression to predict exercise modality preference and found that the null hypothesis failed to be rejected. The expected finding was that younger participants between the ages of 25 and 40 who were extroverted and agreeable would prefer exercising in a group, while older participants between the ages of 40 and 65 who were neurotic, open, and conscientious would prefer exercising alone. I found that exercise modality preference cannot be predicted from the Big-5 personality traits for age. This finding suggests there is a temporal stability inherent in exercise modality selection for any age and suggests that personality is a systematic and continual correlate of activity.

The present research did have significant conclusions for all three research questions. Although all of the hypotheses were not supported, several conclusions were consistent with previous research. According to Courney and Hellsten (1998), the Big-5 can help examine the relationship between personality and exercise behaviors, including exercise modality preference. The present study results confirmed their conclusion, showing that personality traits in the Big-5 can predict exercise behavior, such as exercise modality preference.

Inconsistencies exist in the conclusions regarding the relationships between openness and agreeableness and exercise behaviors. Some researchers have found that agreeableness and openness are related to exercise behaviors (Hausenblas & Giacobbi, 2004; Lewis & Sutton, 2001), and others have concluded that, on a whole, these two traits are not related to exercise behaviors (Rhodes & Smith, 2006). The results of the present study support the conclusion that openness is a predictor of exercise behavior. I

found that openness is a predictor of exercise modality preference, specifically in regards to having a negative preference to technology.

Some research shows that conscientiousness, agreeableness, and neuroticism are predictors of exercise behaviors (Connor & Abraham, 2001; Lewis & Sutton, 2001; Otonari et al., 2012). The present research supported the findings that neuroticism is a predictor of health-related behaviors, concluding it is a significant predictor of exercise modality preference, but may not confirm an effect of conscientiousness on the preference for certain exercise modalities. Although this finding supports some research, it contradicts other findings. According to Conner et al. (2007), research on the personality trait conscientiousness shows the effect size is small. The present findings showed a trend toward significance for conscientiousness; therefore, a larger sample size may have made conscientiousness a statistically significant predictor of exercise training preference.

Limitations of the Study

Several limitations may have affected the results in this study. The more significant factor may have been the small sample size. Although the sample was adequate for running a multinomial logistic regression, it was the minimum number that could be used for this analysis. The sample size of 10 times the number of variables was used as recommended (Warner, 2008); however, after running the analysis, I found that a larger sample size may have produced another variable as statistically significant. A larger sample size may have given a more accurate view of the population. The geographic location may have also been a factor. Although representative participants

were from all areas of the United States, higher participation rates occurred in some parts of the country, and the western states may not be as well represented as other areas of the United States. This would make it difficult to generalize the findings of this study to the broader population (Warner, 2008).

Another limitation was that the type of exercise of each participant was not known. Although it may not affect the exercise modality preference, it may have added another layer to the study. The fourth limitation was that the process was not monitored. Participants completed the research surveys online. The participants could take the surveys on any electronic device that supports www.surveymonkey.com; therefore, any number of factors could have played a role in the answers provided by the participants such as honesty, distraction, or time.

One limitation of the personality survey instrument (BFI-10) is that it was developed from the full scale BFI-44. I chose this instrument because of time and money restraints; however, the BFI-44 has higher levels of reliability and validity (Rammstedt & John, 2007). The answers on the BFI-10 may also be affected by the person's mood at the time. An example of a couple questions on the BFI-10 are, "I see myself as someone who is talkative" and "I see myself as someone who is full of energy." These questions may be influenced by the quality of the participant's day, or by the influence of self-report bias, which occurs because participants tend to respond more positively about themselves. This is not expected to invalidate the findings, as the BFI was constructed with consideration for this possibility (Rammstedt & John, 2007), and it is a common consideration for self-scored surveys. Self-selection bias is a possible limiting factor to

the validity of the results, as participants were recruited from Survey Monkey Audience, which includes a population of individuals who have chosen to take surveys through Survey Monkey, which will donate to a chosen charity on the participant's behalf. To combat this, specific criteria for exercise habits and age were implemented, though they may not be able to completely mitigate this effect.

Recommendations

There are several interesting research recommendations that emerged as possible areas of future research. First, this study can be taken one step further in predicting exercise modality preference for specific types of exercise within each modality. It is possible that an individual prefers to exercise alone when running but prefers to exercise in a group when doing yoga. Future researchers should consider analyzing if there are personality traits in the Big-5 that can be identified for preference in group exercises versus individual exercises. Second, I did not explore the influence of personality traits on a participant's preference regarding frequency and vigor of exercise. Third, I did not use the participants' demographic information as predictor variables. It would be interesting to see if income range, and geographic location played a factor in the decision of exercise modality preference. In addition, future researchers should be as rigorous as possible, with large samples, valid and reliable instruments, and potentially physiological instruments to confirm exercise, such as actigraphs. Such studies would confirm or clarify the findings here with a high level of confidence. Future researchers should explore the lived experiences of the participants through qualitative studies. The results of qualitative studies will provide perceptions of the relationship between personality

traits and exercise modality preference.

Implications

The issue of living an unhealthy lifestyle is a problem that costs America billions of dollars a year because of the cost of diseases and disorders not only for the individual but also for the families of unhealthy individuals (Tremmel, Gerdtham, Nilsson, & Saha, 2017). Knowing that most individuals will quit within 6 months of beginning an exercise program (Buckworth et al., 2013; Middelkamp & Steenbergen, 2015), it is easy to see that exercise prescription methods need a more effective way of being created. Each of these individuals has families who are affected by the unhealthy lifestyle and lack of exercise. Lack of exercise is an extensive problem, not only to those who do not exercise but also to anyone in the community. This lack of activity is usually accompanied by other unhealthy decisions, which necessitate the need for better programming. In short, living an unhealthy lifestyle affects everyone.

Being able to predict which exercise modality is best suited for individuals may have a significant impact on social change, as it would enable those who work to increase physical activity, including fitness instructors, personal trainers, and even clinicians, scientists, and educators to develop and to implement primary prevention plans that would be more likely to lead to exercise maintenance, and therefore prevent individuals from ever becoming unhealthy. These implications for social change include the possibility of exercise interventions that are more effective and, thus, reduce the individual and societal costs associated with lack of exercise.

Social Change Impact on Individuals

A primary prevention plan is the most effective and efficient intervention for combating the issue of lack of exercise. Predicting which exercise modality an individual may be more attracted to will enable physician's prescribing physical activity to their patient, to a gym offering personalized exercise prescriptions to its members to establish better primary prevention plans. These plans can be customized and adapted towards educating individuals on the use of personality testing to determine a particular exercise modality prior to their initial start of an exercise program, as opposed to just allowing individuals to begin any exercise modalities they choose. Therefore, the implications for social change concerning unhealthy individuals with lack of exercise issues are great when we understand the relationship between personalities and a propensity towards a particular exercise modality of choice.

Social Change Impact on Families

Families are impacted in many ways by unhealthy lifestyles and lack of exercise specifically (Walters, 2012). The emotional and physical scars left behind by an unhealthy parent can cause children to have issues that will follow them throughout their lives. The turmoil they face growing up make them prime candidates for treatment, which will cost these family members a great deal of money, pain, and years of counseling. Many of them also will become involved in using and/or abusing medications (Farhud, 2015). Significant others who are unhealthy and do not exercise may become seriously ill, which can cause them to have to undergo medical treatment as well as psychological treatment (Tremmel et al., 2017). The unhealthy lifestyles may be reported, which also

may cause the family further financial problems. Another issue related to unhealthy lifestyles is the lack of activity, which has been known to promote the spread of diseases and disorders (Groven & Engelsrud, 2010; Panwar et al., 2015). Finally, parents of children who are unhealthy not only feel the financial burden of paying for doctor visits, medications, and possible rehabilitation, but also have their own unhealthy issues that may be exacerbated by the stress and emotional pain of seeing their loved one going through this process.

Understanding the relationship between personality type and exercise modality of choice will help professionals to notify parents and caretakers of the particular exercise modality to which their loved one may be most attracted. These choices may indicate that the loved one for whom they are responsible may need special considerations. Caretakers are an essential part of a person's upbringing and will be the best indicator of changes in attitude in the individual's natural environment. Understanding these changes will provide important information to ensure that lack of exercise does not occur. Preventing individuals from not exercising and eventually becoming unhealthier will decrease the chances of them becoming sick because most individuals who become sick never find an exercise choice they can stick too. As such, the implications for social change are great.

Social Change Implications for Society

The costs to society to prevent, treat, and police unhealthy lifestyles are significant. Understanding the relationship between personality type and exercise modality of choice can assist in preventing this problem from becoming worse and, therefore, can save the country billions of dollars. Lack of exercise is not a problem that

is isolated but rather is an issue that affects society as a whole. Therefore, society must do everything possible not only to combat lack of exercise, but also to prevent it.

Conclusion

Exercise is an important part of living a healthy lifestyle and helps maintain good physical and emotional health (Kushner & Choi, 2010; Lee et al., 2008; Ströhle, 2009; Walters, 2012). The purpose of the study was to determine what factors affect individuals' preferences of how they exercise to help them live a healthy lifestyle. I focused on predicting exercising delivery preferences by using the personality traits in the Big-5 (McCrae & Costa, 2008). Not all hypotheses were supported, but they provided an interesting picture of personality and exercise behaviors. The first research hypothesis was substantiated, finding that neuroticism and openness were predictors of exercise modality preference. This research also was able to find that neuroticism was the strongest predictor of exercise modality preference. Research that predicts health-related behaviors is imperative because of the importance of living a healthy lifestyle; therefore, more studies need to be conducted to better understand the factors that promote good health and exercise. Lack of exercise in its many forms appears to be endemic in modern society. Although it is not a new phenomenon, systematic study of it, particularly in its relationship to personality, is relatively recent and evolving. With this in mind, the present study results provide researchers with many possibilities for future research projects, and the results provide practitioners with tools to improve the health of the people they serve.

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