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Exercise Behavior Determinants of the United States Military and Veterans

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
2026

Abstract

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MS, American Military University, 2010

BS, University of Delaware, 2005

Dissertation Submitted in Partial Fulfillment

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Abstract

Despite organizational policy and access to physical activity facilities, the U.S. Department of Defense has observed an increase in the prevalence of service members classified as overweight or obese. Guided by the social-ecological model, this quantitative study investigated the work-related exercise determinants within the U.S. military community. Voluntarily recruited current and former service members from Stars and Stripes completed the Office Exercise Behavior Determinant Scale and the International Physical Activity Questionnaire, along with demographic and biometric questions, to identify physical activity behavior and potential barriers. Findings revealed statistical significance related to exercise duration and military variables (e.g., occupation, race/ethnicity), as well as statistical significance among military characteristics and both intrinsic motivation and extrinsic motivation. The results indicated no statistical significance between the military variables and the social environment and work environment. The implications for positive social change include a better understanding of the barriers associated with physical activity participation within the military community, which may improve organizational policy and sustain health outcomes.

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Dedication

I dedicate this dissertation to all those who have provided both spoken and unspoken support to me during the doctoral process. It is without a doubt that this process would not have been completed without my faith in God and the encouragement from my family, friends, and coworkers that helped me complete this journey. The prayers and support kept me on the path that will hopefully improve the health of the military community, because their sacrifice is without measure.

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Chapter 1: Introduction to the Study

Physical readiness is a primary component of mission readiness within the U.S. Department of Defense, also referred to the U.S. Department of War. Because the mission of the U.S. Department of War (n.d.) is to "provide the military forces needed to deter war and ensure our nation's security" (para. 1), the U.S. Army, U.S. Navy, U.S. Marine Corps, U.S. Air Force, and U.S. Space Force defend America's freedom through the respective missions of each branch. A memorandum from the Secretary of War emphasized the importance of physical fitness standards for combat arms and noncombat arms occupations, ensuring that the standards of each military branch accurately reflect the service members' contributions to the readiness of the U.S. military (Hegseth, 2025). To support this mission, service members must meet the branch's physical fitness requirements, including muscular endurance and cardiorespiratory fitness tests (Military OneSource, 2022). Even after entering the military, service members must maintain the physical fitness requirements and body composition standards or risk administrative separation (U.S. Department of Defense, 2022c). The fitness culture that supports each service member's physical activity needs is essential, and the individual service member, their family and friends, military command, leadership, and the environment all contribute to the readiness and fulfillment of the military's mission.

Trends in physical activity behavior vary across the respective military branches, contributing to increased obesity rates and diseases and illnesses associated with sedentary behavior. Because physical inactivity is associated with increased body weight, Salvo et al. (2025) stated that a culprit to the obesity epidemic in the United States is

sedentary behavior. The U.S. Department of War indicated in the 2023 *Health of the Force Report* that 23% of service members were classified as obese, whereas the military average in 2018 was 18% (Defense Health Agency Public Health, 2025). The Centers for Disease Control and Prevention (2024b) infographic, *Unfit to serve: Obesity and physical inactivity are impairing national security* indicated the impact of physical inactivity, noting increases in obesity-related health care ($1.5 billion annually) and reduced productivity (i.e., lost duty days, increased injury risk).

Because physical activity is associated with Healthy People goals to prevent disease, injury, and death, the U.S. Department of War can evaluate service members' physical activity frequency against the national objective. According to the 2018 behavior survey, 71.8% of service members met the Healthy People 2020 goal of engaging in moderate physical activity (150 minutes or more) or vigorous physical activity (75 minutes or more) per week, with only 49.6% meeting the goal for muscle-strengthening activities (Meadows et al., 2021). More recent self-reported data indicated a higher frequency of physical activity among military personnel. According to 2023 data from the Defense Health Agency Public Health (2025) on active-duty military, 87% met the recommended frequency for aerobic activity, 89% met the recommended frequency for strength training, and only 82% met the combined frequency for strength training and aerobic conditioning. Given the association between physical activity and body weight, as well as trends in physical activity within the U.S. military, there was a need to explore office-related factors that influence physical activity.

Multiple determinants may exist within the military that influence service members' physical activity behaviors. The social-ecological model (SEM) provided the theoretical foundation to examine the intrapersonal, interpersonal, organizational, environmental, and policy influences on physical activity. Using a quantitative research design allowed for identifying determinants of physical activity within a military population that may be statistically significant. This chapter provides background information, the problem statement, the purpose of the study, research questions and hypotheses, the theoretical foundation, the nature of the study, definitions, assumptions, scope and delimitations, limitations, the significance of the study, and a summary.

Background of the Study

The U.S. Department of War emphasized the importance of physical activity for mission readiness, establishing requirements for service members to maintain optimal fitness and body composition (Chairman of the Joint Chiefs of Staff, 2013; U.S. Department of Defense, 2022c). The indicated physical requirements and demands to fulfill the military mission exceed the general physical activity guidelines for individuals to prevent or reduce illness and disease (U.S. Department of Defense, 2022c; U.S. Department of Health and Human Services, 2018). Although the U.S. Department of War has allocated multiple resources to support and enhance physical activity behaviors, service members have indicated a lack of physical activity, potentially resulting in the increased prevalence of obesity within the military (Centers for Disease Control and Prevention, 2024b; Meadows et al., 2021). Additionally, research on health indicators, inclusive of military and veterans, has indicated male service members as being more

overweight when compared to male civilians and veterans, but not obese (Hoerster et al., 2012). In contrast, exercise behavior is higher among male and female service members when compared to veterans (Hoerster et al., 2012; Lehat et al., 2012). The frequency of self-reported physical activity among military members varies. Regarding gender, there is an increase in physical activity engagement among men due to motivational factors including perceived benefit and the perception of injury (Lee & Park, 2021).

Mullie et al. (2013) indicated that 57.8% of service members reported high physical activity levels, 21.7% moderate physical activity, and 20.7% low physical activity based on the International Physical Activity Questionnaire (IPAQ) classification. The current frequency of physical activity signals the existence of exercise-related determinants among U.S. service members, negatively contributing to the health behaviors of veterans (Haibach et al., 2016; Hoerster et al., 2012; Lehavot et al., 2012). Furthermore, various studies have examined physical activity behaviors and determinants within both military and civilian physical activity settings.

Military agencies can positively influence health behavior by allocating resources and reducing barriers. Sociodemographic risk factors identified through previous research contribute to physical activity within military occupations (Cavalcante Neto et al., 2019). Moreover, service member rank, work-related stress, and psychological distress can influence physical activity behavior (Martin & Lopes, 2013). The physical environment, self-efficacy, and social norms are factors identified as contributing to the physical activity behaviors of service members (Benisti & Baron-Epel, 2023). Self-efficacy has been recognized as a determinant of physical activity within a military health care

environment, with a need to improve exercise enjoyment, reduce work-related conflicts, and decrease physical activity discomfort (Nelson & Gordon, 2003). Barriers identified by service members have also included the ability of service members to exercise during the day, access fitness professionals, access childcare, access more indoor facilities, and access programming (Hearn et al., 2018).

Determinants of physical activity behavior have been investigated within the military community, with recent research on the Jordanian military recruits. Malkawi et al. (2025) explored the determinants of exercise among male and female recruits, identifying that their population was physically active, highly motivated, and intrinsically motivated. In addition to individual factors researched in military communities that influence physical activity behavior, external sources affect behavior in civilian populations. Access to facilities, transportation, and aesthetics are environmental factors contributing to nonsedentary behavior, with social support and social norms mediating exercise behavior within an interpersonal context (Mema et al., 2022).

Problem Statement

As the military is an occupation with established physical activity requirements, increases in sedentary behavior contribute to reduced workplace productivity, increasing the associated negative consequences of physical inactivity. Because mandated in policy, service members must maintain adequate physical fitness and body composition standards to ensure combat readiness, prevent injuries, and fulfill the military branch's mission (U.S. Department of Defense, 2022c). Heinrich et al. (2022) indicated that physically active service members contribute to mission readiness through increased job

task ability, fewer injuries sustained, and improved overall health. With established requirements for physical activity and body composition, the frequency of physical activity across the U.S. Department of War varies, potentially contributing to the increased prevalence of service members who are overweight or obese.

The physical activity guidelines were developed to provide recommendations for physical activity for individuals, organizations, and stakeholders, aiming to prevent disease and promote health (U.S. Department of Health and Human Services, 2018). Measured against the physical activity frequency, 28.2% of service members reported not meeting the guidelines for aerobic physical activity, with 50.4% of service members performing muscle-strengthening activities less than three days (Meadows et al., 2021). Because physical activity plays a crucial role in achieving positive health outcomes, sedentary behaviors may increase the risk of all-cause mortality, brain health issues, injuries, and obesity-associated diseases (e.g., type 2 diabetes, hypertension, high cholesterol; U.S. Department of Health and Human Services, 2018). Even with an emphasis on physical activity and ideal body composition, the U.S. Department of War has observed an increase in the prevalence of obesity. Military branches have observed a rise in obesity across the U.S. Department of Defense (2019; 2022a), with the average rate increasing from 17.4% in 2018 to 22% in 2021 and 23% in 2023 (Defense Health Agency Public Health, 2025). Additional self-reported surveys indicate that only 35.9% of service members are of normal weight, with 49.1% overweight and 14.4% obese (Meadows et al., 2021). Failing to adequately support the physical activity needs of service members would continue to contribute to reductions in health outcomes, reduced

physical capacity, and an even greater prevalence of obesity within the U.S. Department of War. The Centers for Disease Control and Prevention (2024b) have indicated that the U.S. Department of War incurs $1.5 billion in obesity-related health care expenses and loses 658,000 workdays due to service members. The support and resources provided to military members during service are inadequate, because the U.S. Department of Veterans Affairs (2014) estimated that 78% of veterans are overweight or obese. Within the veteran population, physical activity may not be the sole perpetrator, because medication use, dietary habits, and military service exposure may contribute to the prevalence of veterans who are overweight or obese (U.S. Department of Veterans Affairs, n.d.a). When examining physical activity within the military environment, there is limited evidence on the determinants of office-related exercise behavior.

Purpose of the Study

This quantitative study aimed to identify office-related determinants of physical activity among personnel within the U.S. Department of War and those who have served in the military. The physical activity culture in the U.S. Department of War may have a positive or negative long-term effect on sustaining physical activity behaviors. In addition to the physical activity behaviors observed during military service, these behaviors may also contribute to the physical activity behaviors of veterans and retirees. The SEM's interpersonal, intrapersonal, organizational, community, and policy levels can identify and explain the barriers and influences related to physical activity behaviors. The factors influencing veteran behaviors may include sustaining behaviors supported by military physical readiness policy, education and services from fitness leaders, Morale, Welfare

and Recreation, or other military weight management programs. Because installations and commands are directed to provide physical activity opportunities, the prevalence of unhealthy body weight and obesity in the military community continues to increase.

Research Questions and Hypotheses

The following research questions and hypotheses were tested in this study:

RQ1: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency?

H_{01}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency.

H_{a1}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency.

RQ2: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI?

H_{02}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI.

H_{a2}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI.

RQ3: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI?

H_{03}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI.

H_{a3}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI.

RQ4: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI?

H_{04}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI.

H_{a4}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI.

RQ5: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI?

H_{05}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI.

H_{a5}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI.

Theoretical Foundation

Efforts to improve health behaviors require acknowledging both the positive and negative influences. The SEM supports the exploration of an individual's attributes and understanding of their relationships and environment (Bronfenbrenner, 1977). An ecological approach is the theoretical foundation for identifying determinants in health behaviors. The SEM aids in explaining behavior through both internal and external factors (Hayden, 2022). The SEM's intrapersonal, interpersonal, organizational, environmental, and societal levels identify the various factors influencing behavior. These levels provide a greater understanding of physical activity within an individual and their community. Through the application of the SEM, it is known that affecting one of the model's levels influences the other (Hayden, 2022). The SEM provides an opportunity to identify the variables that give insight into physical activity behaviors. Lee and Park (2021) recognized the strength of the SEM in determining the personal qualities,

social environment, and physical environment concerning physical activity behavior. The SEM provides a theoretical foundation for identifying determinants of physical activity within a military environment. By identifying the determinants, the SEM can be developed to identify influential factors relating to the behaviors of the targeted population. With links to determinants of health, physical activity behavior can be influenced by multiple factors, contributing to reductions in quality of life and increased disease risk.

Multiple characteristics contribute to the impact of physical activity behavior on U.S. service members and the military community. Krueger (2000) identifies military culture, which consists of the service members' attitudes and beliefs, the military organizational structure, and the influence and adaptation of societal evolution on the military. The factors that provide the individual level of influence of the SEM are attitudes, beliefs, behaviors, and demographic characteristics. These factors represent the intrapersonal level of the model and influence the behavior within the military. The social and physical environments represent the SEM's interpersonal, organizational, and community levels, expanding upon the intrapersonal level. The interpersonal and organizational levels identify the influence on behavior from relationships with friends, family, and peers, further supported or constrained by organizational rules and policy as external factor (Hayden, 2022). In a military environment, the interpersonal level can represent physical activity influenced by fellow military members, military leadership, and their family members. The organizational level represents the specific setting in which influence may occur. Military policies such as the Total Force Fitness and the U.S.

Department of War Physical Fitness/Body Composition Program are organizational-level influences that aim to support service members in attaining optimal physical activity levels.

Additionally, an emphasis was placed on physical fitness standards, requiring the evaluation of existing standards and potential revisions within six months, with an intended focus on standards for military occupations (i.e., ground combat, special operations, and specialized) and sex-neutral standards (Hegseth, 2025). As a unique population, exploring community-level influence within the military can represent the norms within the community or the community established by the service member's military branch. Policies and behavioral norms play a significant role in promoting physical activity and shaping the culture within the military. When considering the influence of behavior, the outermost level of the SEM is the societal level, which influences behavior based on the economic climate, societal norms, and expectations.

The SEM relates to the quantitative approach used by the study in identifying determinants within the military. Because the study explores contributions to office exercise behavior, an alignment exists with the SEM. The study's approach identifies the motivation and environmental factors influencing exercise, which provide internal and external influences supported by the SEMs at both internal and external levels. Specifically, applying the SEM using a quantitative approach allows for identifying determinants that may be significant, further supporting changes to the culture or environment of the military.

Nature of the Study

A quantitative research design was used to identify the office-related determinants of physical activity behavior among current and former service members. Quantitative research allows for a structured approach to collecting objective data to describe characteristics within the targeted population (Salazar et al., 2015). Using a descriptive quantitative design will enable a focus on the factors that contribute to the frequency of physical activity among current and former military members.

A partnership was established with Stars and Stripes to collect the necessary data on the population. Support from Stars and Stripes was established following an email inquiry with the Director of Engagement. Following a telephone conference, initial support was provided, along with the necessary legal endorsement for survey dissemination, and final support was obtained. Stars and Stripes is an independent military news organization targeting service members and veterans. Stars and Stripes (n.d.) has indicated over 50 million website page views, with 26.9 million unique visitors. Due to the population's size, convenience sampling was used for data collection. Through the partnership with Stars and Stripes, convenience sampling facilitates data collection from service members, thereby reducing the internal review board process and the endorsement required by the U.S. Department of War for conducting the intended research. Service members and veterans wishing to participate in the research completed the self-administered IPAQ and the Office Exercise Behavior Determinants (OEBD) scale, along with military-related demographic questions (e.g., age, military occupation, rank).

The independent and dependent variables for this research involved physical activity frequency and determinants of physical activity. Demographic questions and the office-related exercise determinant scale were the independent variables for this research. Demographic questions will be age, employment status, gender, ethnicity, and race. Because the research population will consist of military and veterans, employment status questions included military affiliation, rank, and military occupation, which were included as independent variables. All demographic questions, excluding age, were categorical variables. The IPAQ - Short form included participation in physical activity and duration of vigorous and moderate physical activity, which are the dependent variables. Participation in physical activity was the dependent variable due to the potential effect of the determinants of physical activity within the military community. The IPAQ-Short Form captured ratio levels of measurement with responses to the length of time individuals participate in vigorous and moderate physical activity, walking duration, and time spent sitting. Responses to the number of days an individual engages in vigorous activity, moderate activity, walking, and sitting are an ordinal level of measurement. Individuals who fail to participate in physical activity may be influenced by the factors identified as the dependent variables.

Compared to individuals participating in physical activity, a lack of physical activity may result from the influence of the dependent variables. For this research, the dependent variables consisted of the 32-item OEBD scale using a 7-point Likert Scale. The OEBD scale captured four factors, including the associated determinants that allow for exploring exercise behavior within the intended population. Competence, enjoyment,

perceived health, superior influence, work pace, and work burden are dependent variables as they may affect physical activity behavior.

Current service members and veterans were included in this research as they can identify the factors that influence physical activity. The influence would be based on their beliefs and environment, as well as how military environments, missions, culture, and policy cultivate an environment that supports physical activity during and after military service. Furthermore, the population identified characteristics contributing to physical activity behavior. Research on the population enables potential collaboration with health professionals to enhance the behaviors of veterans and service members. Haibach et al. (2021) note that health improvements within the target population may yield more meaningful and applicable results by incorporating the qualities of stakeholder engagement and employing a science-based methodology. If determined to be of value, the intended population would contribute meaningful data within each level of the SEM. This insight can guide and inform government policy and frameworks to reduce the health costs associated with physical inactivity and increase the effectiveness of services provided within the U.S. Department of War and the U.S. Department of Veterans Affairs.

Definitions

The following definitions were used for this study:

Active duty: An individual who currently serves in the U.S. Department of War for Air Force, Army, Marines, or Navy. Also referred to as a service member or military member.

Enlisted: Individuals serving in the military, typically entering military service without an undergraduate degree and holding a military rank of E1 through E9.

Officer: An individual with a minimum of an undergraduate degree, commissioned into the military and serves as a manager and leader.

Physical readiness: The ability of a military member to perform the physical duties of military service (e.g., combat).

Retiree: An individual who served in the uniformed service for the minimum time and is entitled to retainer pay.

Veteran: An individual who served in the uniformed service but was discharged or released before the ability to retire.

Assumptions

This study will investigate the office-related exercise determinants of military members and veterans. The following are the assumptions considered:

1. Respondents are or were enlisted or commissioned in the U.S. military.
2. Participants completed the survey voluntarily, providing truthful responses.
3. Respondents possess the ability to be physically active (e.g., injury, illness)

Scope and Delimitations

The specific aspects of the research problem to be addressed are potential determinants of office exercise behavior. Within the U.S. Department of War, there has been a long-standing emphasis on physical activity, with governance and resource support to maintain physical readiness. Government and military leadership have acknowledged and recognized an increase in body composition within the U.S. military,

citing an improvement in service member dependability and a decrease in obesity-associated budget support (Webber et al., 2023).

Limitations

Being a quantitative study, limitations exist in that sufficient access to the target population is unsupported, and there is no control over the respondent's environment. Because the research is not endorsed by the U.S. Department of War and the U.S. Department of Veterans Affairs, access to service members and veterans limits the access to research participants. The estimated population of service members and veterans is 18,305,910 (Defense Manpower Data Center, 2023; U.S. Department of Veteran Affairs, 2022), requiring approval of multiple governmental internal review boards for research endorsement and authorization to have the respective service members and veterans complete the survey. Although access to the target population is a limitation, the *2018 Department of Defense Health Related Behavior Survey (HRBS)* received 17,166 surveys from 199,996 invited service members, from a sampling frame that consisted of 1,357,219 (Meadows et al., 2021). Because a low response rate is also anticipated for the intended research based on the military total population, there is an increased probability of survey data bias and disproportionate survey responses.

Significance of the Study

The study's results would be significant as identifying the determinants of office-related physical activity may aid the military community by positively influencing exercise behavior. Addressing the determinants within the military may improve the health culture, thereby reducing sedentary behaviors among service members and

veterans. The lack of physical activity is associated with obesity and other adverse health impacts, increasing government health care expenses and reducing service members' physical readiness ability and capability. The significance of this study lies in its potential contributions to the advancement of SEM and military physical readiness policy and resources, ultimately leading to positive social change.

Significance to Theory

In the United States, there has been an increase in the prevalence of overweight or obese adults. Li et al. (2022) identified the increase based on National Health and Nutrition Examination Survey (NHANES) responses, mentioning the 32% increase in obesity from 2003-2004 to 2017-2018 responses. Additionally, only 67.4% of NHANES respondents stated they met the recommendations, and only 53.3% identified meeting the aerobic guidelines by the National Center for Health Statistics (Li et al., 2022). Following the Coronavirus 2019 (COVID-19) pandemic, decreases in physical activity have been observed. Van Dyke et al. (2023) state that reported physical inactivity decreased from 24.5% to 23.8% from 2018 to 2020. Although researchers have reported decreases in physical inactivity, there is a growing prevalence of Americans who are overweight or obese. With physical readiness requirements captured in policy, the U.S. Department of War has seen an increase in the prevalence of current service members, veterans, and retirees classified as obese or overweight (Centers for Disease Control and Prevention, 2024b; U.S. Department of Veterans Affairs, 2014). Conceptually, the SEM is a prevention-based framework with established levels of support and influence that contribute to health behaviors. The intrapersonal, interpersonal, organizational,

environmental, and public policy factors are the specific levels of the SEM that support and influence current and former service members. Identifying the determinants across the SEM's influential levels allows the military and the U.S. Department of Veterans Affairs to target the specific factors that impact service members and veterans from being physically active. The significance of the SEM within the military and veteran communities allows for identifying how the individual, personal relationships, the military, and policy influence physical activity. The office-related exercise determinants identified by the research participants can justify modifying the military's environment, supportive policies, or further research exploration.

Significance to Practice

The U.S. Department of War issues a specific policy concerning physical fitness and body composition for implication in each military branch. The U.S. Department of War Physical Fitness/Body Composition Program instruction explicitly identifies the requirements for the branches to establish a fitness program and testing protocols (U.S. Department of Defense, 2022c). The fitness program targets the insurance so the service members can meet the specific requirements for the service member to aid in completing the branch's mission. Furthermore, the U.S. Department of War policy infers the importance of physical fitness and the Total Force framework established by the military's Chairman of the Joint Chiefs of Staff. Total Force Fitness and its eight domains, including physical fitness, provide a framework for the military to enable service members to improve their health and well-being, using a holistic approach to enhance lethality, resilience, and readiness (Chairman of the Joint Chiefs of Staff, 2013).

Through exploration and identification of the office-related exercise determinants, increased resource allocation can target improved physical activity behaviors of service members. This increased resource allocation additionally benefits veteran behavior in that physical activity may be sustained following military service by the U.S. Department of Veterans Affairs or through the continuation of services provided by the U.S. Department of War. Additionally, military leaders and support staff gain insight into the determinants of physical activity at the different social-ecological levels, allowing for programs and services to be revised to target specific determinants. Revisions to existing programs and resources may reduce barriers to participation in physical activity, as these resources can address motivational and environmental factors during military service and afterward.

Significance to Social Change

Walden University (n.d.) defines social change as a "deliberate process of creating and applying ideas, strategies, and actions to promote the worth, dignity, and development of individuals, communities, organizations, institutions, cultures, and societies" (para. 3). Positive implications of social change exist through this research on office-related exercise determinants. The exercise-specific determinant has negative consequences on the health of service members and veterans as the prevalence of obesity continues to grow. Sedentary behavior impacts military readiness and increases preventable health care expenses, reducing overall quality of life. Furthermore, the significance of the research allows the government and its staff to use the research findings to spearhead social change by addressing the determinants of health-related to exercise behavior. The World Health Organization (2024) identifies the environment (i.e.,

physical, social, economic) and the characteristics and behaviors of individuals as determinants of health. The research findings can contribute to positive social change by improving conditions that affect optimal physical activity behavior.

Summary and Transition

Physical activity frequency for service members is above the national health objective and higher than civilians, nonetheless, obesity-related health care continues to impact mission readiness (Centers for Disease Control and Prevention, 2024b). An exploration into determinants of exercise is needed due to the growing prevalence of obesity among veterans and service members (Defense Health Agency Public Health, 2025; U.S. Department of Veterans Affairs, n.d.a). Multiple influences contribute to physical activity behaviors in service members, such as job-related stress, duty hours, military culture, and the need for improved self-efficacy within the military (Benisti & Baron-Epel, 2023; Hearn et al., 2018; Krueger, 2000). U.S. military policy can further improve physical activity behavior in service members and veterans through targeted approaches to identified determinants. Furthermore, addressing the physical activity determinants during military service can improve exercise behavior and the overall well-being of veterans (Haibach et al., 2016; Hoerster et al., 2012; Lehavot, 2012). However, further research is necessary to identify determinants of physical activity within the military community to reduce the prevalence of current and former service members who are overweight or obese, by increasing the frequency of exercise to meet the U.S. Department of War, U.S. Health and Human Services, and Healthy People objectives (Centers for Disease Control and Prevention, 2024b; Defense Health Agency Public

Health, 2025; Meadows et al., 2021). Chapter 2 comprehensively reviews the research on physical activity behavior within military and veteran populations. Also, behavioral theories are explored to understand influences on physical activity that may support or deter physical activity behavior among service members and veterans.

Chapter 2: Literature Review

The health of U.S. service members and the increasing prevalence of obesity in the U.S. Department of War have garnered attention from the Centers for Disease Control and Prevention. The Centers for Disease Control and Prevention (2024b) indicated that obesity increased from 16% to 19% in the U.S. Department of War between 2015 and 2020. Increased prevalence of obesity creates a risk to national security through reduced physical performance and overall readiness of service members (Police & Ruppert, 2022). In addition to the performance and readiness detriments, the U.S. Department of War provides health care for obesity-related diseases for service members, retirees, and other health care beneficiaries (e.g., family members). Obesity-related illnesses and diseases contributing to the health care expense include increased cholesterol profiles (i.e., high low-density lipoprotein and triglycerides, low high-density lipoprotein), increased blood pressure, coronary heart disease, osteoarthritis, increased cancer risk (e.g., breast, kidney, colorectal), and reduced quality of life (Centers for Disease Control and Prevention, 2025). In the United States, the estimated obesity-related health care cost is $173 billion (Centers for Disease Control and Prevention, 2024a). However, in the U.S. Department of War, the estimated cost is $1.5 billion for the health care expenses for service members, retirees, and other health care beneficiaries (Centers for Disease Control and Prevention, 2024b). In the U.S. Department of Veterans Affairs, Tanofsky-Kraff (2013) indicated that the obesity-related health care expense from the 72% of veterans (8.5 million enrollees) who received care from a Veterans Affairs Medical Center contributed to more than $1 billion in obesity-related comorbidity expenses.

Literature Review Strategy

While performing the literature review, I used the Boolean system as the primary search strategy to explore the existing literature relating to the topic. The systematic search explored the existence of literature using keywords and necessary syntax within the available databases. The databases of APA PsycInfo, CINAHL, MEDLINE, ProQuest Health & Medical Collection, Embase, Google Scholar, and SAGE Journals were used to perform an exhaustive literature search. The keywords and phrases used in the database search included *military*, *tactical athlete*, *veteran*, *retiree*, *physical readiness*, *physical activity*, *fitness*, *exercise*, *physical activity barriers* and *physical activity determinants*, *weight status*, *obesity*, and *weight management*. The review is organized into service member and veteran weight status characteristics according to SEM constructs.

With a population linked to military service, government websites provided policy, health statistics, articles, and initiatives. Resources were obtained from federal government agencies and websites such as the U.S. Department of War, Defense Health Agency, Military OneSource, Veterans Affairs, and RAND Corporation. Data obtained included the health status of current and former military members and the associated nutrition and physical activity-related obesity behaviors. The U.S. Department of War requires military branches to provide physical activity behavioral support to maintain physical readiness standards. However, a noticeable gap was observed in scientific research because obesity rates continue to increase in the U.S. military and in the sustainment of physical activity behaviors to prevent obesity in veterans.

Article abstracts were read to ensure key terms were included to justify inclusion in the literature review. All peer-reviewed journal articles were retrieved from the Walden University Library, Google Scholar, and the Military Health System Research Branch or the Defense Health Agency. Additional articles obtained from scholarly government sources but not identified as peer-reviewed articles were used as background information and justification for the gap in the literature. Articles and resources that did not provide context relating to obesity prevention by modifying physical activity behavior within the workplace and military or tactical environments, to include retirees and veterans, were considered irrelevant and not included.

Theoretical Foundation: Social-Ecological Model

The organization of the U.S. Department of War and each military branch can contribute to the behaviors of the respective service members and veterans. The unique actions and behaviors of service members may be attributed to their personal life, military occupation, command, and their branch's mission, with influence from the SEM. The existence of an ecological system affects the active-duty military and veteran physical activity and health behaviors. The ecology of current and future health behavior is influenced by an individual's microsystem, mesosystem, exosystem, and macrosystem (Bronfenbrenner, 1977). It is the exploration of the service member's environment where contributions and influences on physical activity behaviors can be detected and modified. A microsystem consists of developmental opportunities, personal experiences, and contributions from the established environment, with interpersonal relationships guiding behaviors in the mesosystem (Bronfenbrenner, 1977). The microsystem may consist of

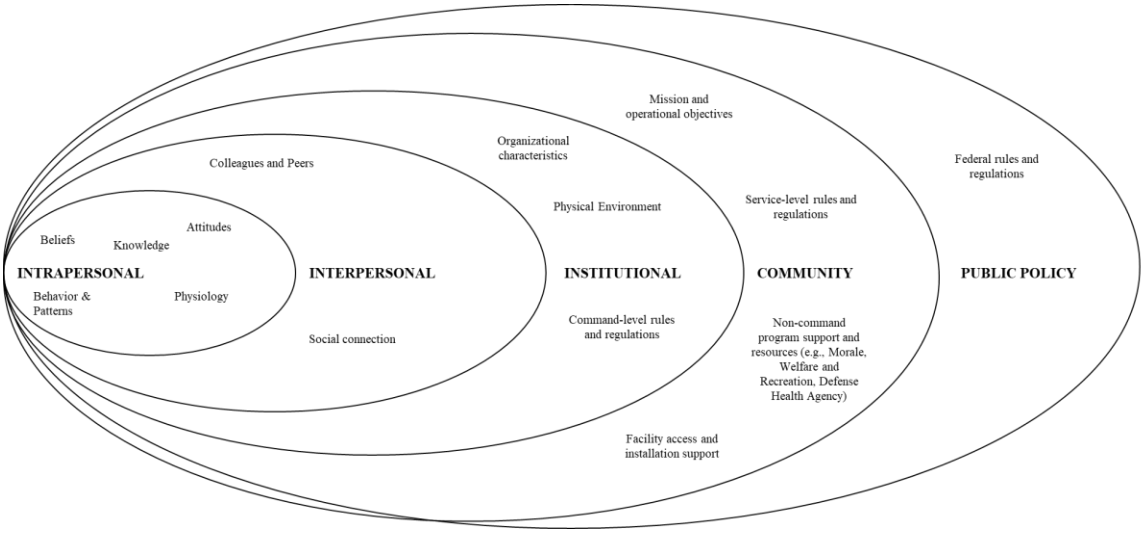
health behaviors before military service and is influenced by the service member's culture, attitudes, values, and beliefs during military service. Health behavior influences within the mesosystem can be affected before and during military service through interactions with other service members and the social support they receive. Because the exosystem provides influence from formal and informal relationships, the macrosystem influences individual behavior through established cultural norms and the regulatory law of society (Bronfenbrenner, 1977). The exo- and macro-systems may also influence service members' physical activity behaviors through military policy and access to the appropriate health behavior resources to prevent unnecessary weight gain.

Through additional work exploring the SEM, McLeroy et al. (1988) categorize Bronfenbrenner's SEM into intrapersonal factors, interpersonal factors, institutional factors, community factors, and public policy for health promotion. McLeroy et al. (1988) mentioned that the application of health promotion can be modeled around behaviors and the accompanying outcomes based on the influence of the individual's ecological system. The adaptation of the social-ecological (Figure 1) serves as potential foundation in understanding the influences on physical activity and improving health behaviors within the military community. The SEM levels can identify barriers to healthy behaviors during and after military service by identifying the impacts of the neighborhood, workplace and occupation characteristics, the perceived environment, and individual characteristics that may negatively or positively impact behavior. The SEM theoretical framework can assist the U.S. Department of War and the U.S. Department of Veterans Affairs in understanding the relationship between service member obesity-

related behaviors and the health influences across the factors related to weight management programs and resources.

Figure 1

Modified Social-Ecological Model (McLeroy et al. 1988; Mitvalsky et al., 2023; Trego and Wilson 2021)



The application of the SEM has existed within the military community. Trego and Wilson (2021) explored the SEM and health of female service members based on community interface, organizational qualities, cultural values, and the immediate environment. Additionally, the SEM can assist in identifying health predictors and potential outcomes during Operation Enduring Freedom and Operation Iraqi Freedom service periods. Levels within the SEM identified individual beliefs, behaviors, and physiological characteristics that represent the female service member's core values and health behaviors (Trego & Wilson, 2021). Predictors of health risks at the individual level included combat and deployment stress, deployment length and frequency, and gender,

resulting in post-traumatic stress disorder, depression, substance abuse, and traumatic brain injury (Lubens & Bruckner, 2018).

The SEM is adapted to enhance readiness and minimize the influence of destructive behaviors within the military community. In the SEM by Mitvalsky et al. (2023), optimization is achieved through influential levels that include a separate level of influence. The cultural level included by Mitvalsky et al. (2023) includes factors such as enterprise-wide collaboration, accountability, knowledge sharing, and continuous process improvement. Through the discovery of the influences of physical activity behaviors, the military community can better understand the determinants of the desired behavior to optimize performance and reduce the prevalence of individuals who are overweight or obese in the military community.

Literature Review

Colding and Barthel (2019) outline definitions associated with social-ecological systems framework evolving from biological and social subsystems to the equal influence of the social-ecological subsystems when compared to social-ecological frameworks having a subsystem of higher status. Within the military community, a similar influence of a social-ecological framework on health outcomes and destructive behaviors is observed in tobacco use research. Porter et al. explored the facilitators and deterrents of tobacco use during technical training in the U.S. Air Force. With a social-ecological framework, health professionals can identify the influences on personal, intrapersonal, and environmental behavior. The personal factors influencing health behavior include choice in health behavior, the association the behavior has with the lifestyle that

facilitates the behavior, alternative behaviors, implications related to the behavior, and personal association (Porter et al., 2021).

Additionally, the intrapersonal level influence was influenced by the Airmen's peers, military leadership, and normative beliefs within the U.S. Air Force (Porter et al., 2021). When exploring the environmental level of influence, the cost of participating in the negative behavior, health behavior promotion, and access to the associated behavior influenced the health behavior (Porter et al., 2021). The influences within the Airmen community observed by Porter et al. may potentially identify influences within the other U.S. military branches that impact physical activity behaviors, further increasing the prevalence of service members that are overweight or obese.

Intrapersonal Factors

According to Bronfenbrenner (1977), the microsystem contains the roles and settings contributing to behavior development, later categorized as interpersonal factors by McLeroy et al.. Intrapersonal factors influencing U.S. service members include diversity, cultural beliefs and attitudes, preexisting skills and behaviors, and existing knowledge (McLeroy et al., 1988). The U.S. Department of War consists of individuals with various demographic characteristics, providing an understanding of the different characteristics that may contribute to the prevalence of obesity and the associated physical activity behaviors.

With a population of 1,304,720 active duty and 994,860 ready reserve, the U.S. Department of War consists of multiple cultures, ages, and education levels (U.S. Department of Defense, n.d.). In the U.S. Department of War, 70.3% identified as White,

17% Black or African American, and 5.1% as Asian (U.S. Department of Defense, n.d.). The remaining 7.7% of service members identified as American Indian or Alaska Nation, Native Hawaiian or Other Pacific Islander, Multi-racial, or unknown (U.S. Department of Defense, n.d.). Within the military, 18.2% of active duty are officers, and 81.8% are enlisted, with the E1-E4 being the most prominent military rank group (546,475; U.S. Department of Defense, n.d.). Military OneSource (n.d.) identify the difference between a military officer and enlisted service members by stating officers have completed four-year degrees to become commissioned to manage and lead enlisted service members in fulfilling the mission of the military. When examining the influence of education on physical activity behavior, education may increase an individual's knowledge of the relationship between exercise behavior and reducing disease risk associated with sedentary behavior (Cheah et al., 2026). Increased aerobic activity in adults is observed in most educated adults, although differences have been seen based on demographic factors (i.e., age, gender, race; Scholes & Bann, 2018). However, differences in probability differ based on completing a degree when being physically active. Scholes and Bann (2018) stated that the likelihood of conducting more than 150 minutes of moderate-to-vigorous physical activity is 54.7% for high school graduates, compared to 68.9% for adults with a college degree. Given the higher probability, education may play a role in the frequency of physical activity at the intrapersonal level.

To fulfill its mission, the U.S. Department of War actively recruits potential enlisted and officer service members across the United States of America and its territories (e.g., Guam, Puerto Rico), at schools, colleges, and recruiting depots. The

efforts of military recruiters assist the U.S. Department of War in fulfilling its mission, but global challenges exist, such as the obesity epidemic and cultural influence. Because military recruiting is global, future service members must be within the branch's physical readiness standards (e.g., body composition) to be recruited. The World Health Organization (2025) estimated in 2022 that 43% adults, 18 years of age or older, are overweight, and 16% of the world is classified as obese (BMI greater than 30).

There is a notable difference between the number of male and female service members. Within the U.S. Department of War, 82.5% of all service members are males, 82.9% of all enlisted are males, and 80.3% of all officers are males (U.S. Department of Defense, n.d.). With gender identified as a risk factor for obesity, the U.S. Department of War and its recruiters must address the disparities to support optimal health outcomes and behaviors (Kapoor et al., 2021). Because the prevalence of obesity in those 18 years of age and older, the obesity trends in children may have a significant long-term impact on recruiters. Specifically, 21.2% of adolescents between 12 and 19 years of age in the United States are classified as obese (National Institute of Diabetes and Digestive and Kidney Diseases, 2021). Because childhood behaviors like sedentary activity and poor nutrition habits contribute to obesity, Simmon et al. (2016) noted that the prevalence of obesity continues through adulthood, with 80% of adolescents still classified as obese during their adult years.

Obesity represents a significant health concern within the U.S., with socioeconomic factors like age, family income, and race contributing to the epidemic. In the U.S., adults 40 to 50 years of age have the highest prevalence of obesity (44.3%),

followed by individuals 20 to 39 (39.8%) and then 60 and over (41.5%; Stierman et al., 2021). Non-Hispanic black adults, Hispanics, and non-Hispanic Whites represent the largest race and ethnicity category, with 49.9%, 45.6%, and 45.6%, respectively, classified as obese (Stierman et al., 2021). Additionally, there was a 43.9% and 46.5% prevalence of adult obesity in families when family income was less than 130% or between 130% and 350% of the federal poverty level (Stierman et al., 2021). Given the U.S. Department of Health and Human Services (2022) poverty guidelines for the contiguous states and Washington, D.C., 130% and 350% above the poverty guideline equates to an annual income of between $31,257 and $61,155 for a single-person household ($13,590, single person poverty guideline) which increases by $4,720 for each additional person in the household or family.

U.S. Department of War Health Related Behaviors: Physical Activity

The U.S. Department of War Health Related Behaviors Survey (HRBS) provides obesity-related indicators of service members. Meadows et al. (2021) collected obesity-related data through an internet survey from "cadets in service academies, senior military colleges, and other Reserve Officers' Training Corps programs" (pg. xvii, para 4). The use of the HRBS serves the U.S. Department of War in collecting health behavior information on service members, to include their health status, and access to and utilization of health behavior services. Furthermore, the HRBS allows the U.S. Department of War to assess the progress of the military branches toward the Healthy People objectives.

HRBS U.S. Department of War Weight Status

Aligning with Healthy People objectives, the HRBS uses BMI as the screening tool to determine the weight status of service members. Of the surveyed population, 48.9% of service members were overweight and 14.4% obese (Meadows et al., 2021). Survey responses indicated the U.S. Navy as the service with the highest prevalence of obesity, with 19.7% of sailors classified as obese (Meadows et al., 2021). According to the U.S. Department of War HRBS report, the U.S. Marine Corps had the highest percentage of overweight (51.1%) and normal weight (41.8%) service members and the lowest prevalence of obesity (6.7%; Meadows et al., 2021). The high prevalence of overweight Marines may be caused by BMI not accounting for lean body mass. Because the U.S. Marines have rigorous training and demanding standards (e.g., Combat Fitness Test, Physical Fitness Test), an increase in lean body mass would be expected.

The prevalence of service members who are overweight or obese increased based on rank when evaluating weight categories. Senior enlisted members (E7-E9) had the highest prevalence of obesity (24%) and overweight (58.1%), followed by O4 to O6 service members (14.1% obese and 57% overweight; Meadows et al., 2021). Additional variances were observed based on gender. In the military over half of the men are overweight, 15.2% obese, compared to 38.1% of women being overweight and only 10.1% obese (Meadows et al., 2021). The gender variance is astonishing, as women reported a lower frequency of moderate and vigorous physical activity and strength training.

HRBS Physical Activity and Strength Training Trends

U.S. Department of War HRBS also provided aerobic and muscle-strengthening frequency among the different services and ranks based on the past 30 days. The surveyed population reported that 36.8% performed less than 150 minutes of moderate physical activity, and 52.4% reported less than 75 minutes of vigorous physical activity (Meadows et al., 2021). Variances were observed based on gender and rank with reported physical activity and strength training frequencies. Meadows et al. (2021) found that 33.7% of females and 23.5% of males, participated in strength training, less than one day per week. The frequency of strength training increased based on the number of sessions per week. The U.S. Marine Corps reported the highest percentage of service members (58.9%), with the U.S. Navy having the lowest percentage (40.8%; Meadows et al., 2021).

Moderate or vigorous physical activity frequency varied based on gender, military branch, and rank. Women participated in less frequent moderate and vigorous physical activity than men. Based on gender, 64.7% of men and 55.8% of women participated in at least 150 minutes of moderate physical activity (Meadows et al., 2021). Over half of the service members in the U.S. Department of War met the U.S. Physical Activity Guidelines for Americans for moderate physical activity. In the U.S. Department of War, 63.3% met or exceeded the moderate activity frequency, with 47.8% meeting or exceeding the frequency for vigorous activity (Meadows et al., 2021). Of the respondents, the U.S. Air Force and U.S. Navy were the two branches below the U.S. Department of War's total percentage for meeting the moderate and vigorous physical activity

recommendations (Meadows et al., 2021). As military rank increased, the prevalence of service members not performing moderate or vigorous physical activity increased. The lowest percentage of physically active service members were enlisted, of which 60.7% of E7 to E9s performed moderate activity, with O4 to O6 officers being the least physically active (57.1%; Meadows et al., 2021). The lack of physical activity may have been influenced by changes in the work environment and the shift in focus to military education based on the rank of the population. The reported frequency of physical activity suggests a lack of emphasis within the overall U.S. Navy and U.S. Air Force, which could contribute to the increased prevalence of overweight or obese sailors and airmen. Potential causes based on rank may be the shift in focus, responsibility, and the desire to advance in rank when comparing enlisted service members to officers. Focusing on completing military training and education for senior service members attending colleges or military training may cause reduced physical activity and an increased prevalence of increased weight and obesity.

Use of Body Mass Index to Classify Weight Status

Based on the increasing percentage of service members who are overweight or obese, Clerc et al. investigated the accuracy of BMI in estimating excessive body fat compared to lean body mass. Military service requires and includes specific physical activity and weight standards, assessed semi-annually. These standards are introduced during recruitment and reinforced during each service's basic training. The U.S. Department of Defense (2022c) policy guides each military branch to assess body composition and general fitness, and to conduct physical fitness training, thereby

establishing and supporting behaviors that promote continued military service. Military service is believed to require more lean body mass due to the physical readiness requirements and incorporation of regular physical training and testing. Clerc et al. (2021) stated that the methods used by the U.S. Air Force and U.S. Navy underestimated body fat percentage. This underestimation may indicate that the overall prevalence of service members who are overweight or obese is higher. However, there is a higher prevalence of obesity when BMI is used to assess body composition compared to other body composition methods. BMI may not be an appropriate measure for specialty military occupations (e.g., U.S. Special Operations Forces, Explosive Ordnance Disposal Specialist), as these occupations require stricter physical fitness and body composition standards. Clerc et al. (2021) found a need to adjust the BMI thresholds for U.S. Army infantry males due to the physical fitness demands and the increased percentage of lean body mass. BMI remains applicable as a general tool for the military to determine the weight classification of service members, with alternative methods encouraged for military occupations that require additional training and physical fitness demands. Additionally, within student populations, BMI impacted physical and psychological health within males and females (Lalović et al., 2025).

Individual factors and characteristics have also been found to influence the frequency of physical activity within the military. Characteristics such as gender, age, and musculoskeletal injury have had positive and negative impacts. Within the U.S. Army, Schulze et al. (2016) observed that female soldiers were more physically active than males and had a lower BMI. Additionally, predictors of physical activity included

personal characteristics such as gender, age, and BMI, as an increase in waist circumference was correlated with reductions in physical activity (Schulze et al., 2016). Similarly, quality of life can be influenced by physical activity and BMI.

U.S. Department of War Health of the Force

An annual report by the U.S. Department of War provides insight into the health of the U.S.' warfighters. The Department of War, Health of the Force report, provides a collective representation of health factors that have been identified to impact the military's lethality, including obesity and behavioral health (U.S. Department of Defense, 2022c). Reviews of service members' medical records present a percentage of service members classified as obese, determined by BMI. The Defense Health Agency Public Health (2025) Health of the Force report estimates that 23% of the military are classified as obese, with a higher prevalence in males (24%) when compared to females (19%). The current prevalence represents a 1% percent increase for males and 2% for females from the 2022 report (U.S. Department of Defense, 2022a). The percentage of obese Sailors remains the highest, with 27% of sailors classified as obese, followed by airmen (23%), soldiers (22%), and marines (13%; Defense Health Agency Public Health, 2025). The U.S. Department of War's increase in average service members classified as obese is also reflective of the increased prevalence of obesity in each military branch. The change in the prevalence of obesity observed from the 2019 report, indicated 17.9% of service members classified as obese, to the current average of 22%. The U.S. Navy and U.S. Marine Corps have consistently had the highest and lowest prevalence of obesity, respectively, among service members (Defense Health Agency Public Health, 2025; U.S.

Department of Defense, 2022a, 2022b, 2019). The U.S. Air Force has experienced the most significant change in the percentage of Airmen classified as obese, with 18.4% classified as obese in 2019, compared to 23% in the 2021 report (U.S. Department of Defense, 2022a; 2019).

2023 Health of Force Report

An addition to the U.S. Department of War's Health of the Force report, self-reported frequency of physical activity was included. These frequencies included aerobic activity at the Centers for Disease Control and Prevention's recommended frequency and duration, as well as the frequency of physical activity within a week. The U.S. Air Force reported the highest percentage (89%) meeting the target for aerobic activity, with the U.S. Navy (85%) reporting the lowest percentage of individuals meeting the target aerobic activity frequency (Defense Health Agency Public Health, 2025). The 2022 self-reported activity data for the U.S. Navy indicated that Sailors had the lowest percentage of frequency preforming aerobic activity (85%) and strength training (79%; Defense Health Agency Public Health, 2025). In contrast, the U.S. Army reported the highest compliance 93% for strength training with the U.S. Army and U.S. Marine Corps reported the highest combined aerobic and strength training (85%; Defense Health Agency Public Health, 2025). The U.S. Department of War observed physical activity behavior differences based on age, gender, and race/ethnicity. For aerobic and strength training, the average percentages of females and males meeting the target was 74% and 84%, respectively (Defense Health Agency Public Health, 2025). Based on age grouping, those aged 25 to 34 reported the highest average physical activity. An average of 76% of

females and 86% of males aged 25 to 34 reported meeting the target for aerobic and strength training target (Defense Health Agency Public Health, 2025). Because the link between physical activity frequency including duration and weight status exists, the culture within each military branch may impact service member participation in physical activity along with intrapersonal factors.

Veteran Weight Status

Veterans Health Administration data provides the percentage of obese and overweight veterans receiving care. The Veterans Health Administration estimated that slightly over 45% of the population is classified as obese, with 16% classified as class two or three (Robinson et al., 2022). The prevalence of veterans classified as obese varies based on subpopulation: age, race/ethnicity, residence, disability status, period of service, physical health conditions, and mental health conditions. Specific subpopulations with a higher prevalence of obesity encompassed veterans 45 and 64 years of age (48%), Black or African American females (51%), individuals with a service-connected disability status greater than 50% (47 to 49%), and veterans with a period of service during the Gulf War I/pre- Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn and Post-Vietnam War/pre-Gulf War (Breland et al., 2017). Injuries sustained during military service contribute to the frequency of physical activity among the veteran population. Barriers to physical activity, self-efficacy, and perceived benefits impact physical activity in veterans. Specifically, veterans with lower body amputation perceive the benefits of physical activity as contributing to psychological and physical well-being, however, low self-efficacy represents a barrier to physical activity (Walker et al., 2021).

Microsystem Environment and Military Occupation

The microsystem's environment (i.e., physical, social, and work) included military occupational tasks, unit location and cohesion, and personal support (Trego & Wilson, 2021). As a part of the social environment of the microsystem, social networks (e.g., family, friends, and peers) play a vital role in sustaining and supporting optimal health behaviors. There is an evident correlation between social support (e.g., family support) and positive physical activity (Craig et al., 2026). Physical activity predictors at the social-ecological microsystem level consist of post-deployment mental health, deployment frequency, and length of deployment (Lubens & Bruckner, 2018). Additionally, deployment separation from the service member's families impacted the mental health and behavior of military dependents, potentially contributing to domestic violence (Lubens & Bruckner, 2018).

Military occupation also presents an opportunity to explore how health behaviors vary based on whether a service member is enlisted or an officer. For enlisted personnel, military occupation encompasses subpopulations based on rank (e.g., junior enlisted, senior enlisted) and occupational specialties, including aviation, engineering, warfare, intelligence, medical, and administrative services. The military occupation may contribute to health predictors and outcomes, as it requires service members to maintain a specific level of physical activity to minimize risk to their health and well-being.

One military occupation evaluated for physical activity barriers is hospital employees. The Defense Health Agency oversees the medical services provided to the military branches, each of which has distinct barriers and a unique mission within its

respective medical departments. Common obstacles (e.g., time, knowledge, motivation) may not be found within the military as the military emphasizes physical activity. Hearn et al. explored physical activity barriers in service members and civilians working in a U.S. Army military hospital. Although most of the study population identified themselves as healthy (90%), they expressed a desire to increase their frequency of physical activity and adopt healthier eating habits (Hearn et al., 2018). Respondents identified time off, access to personal trainers, and incentive-based motivation as the top three barriers to physical activity (Hearn et al., 2018). Although the top two barriers for the U.S. Army hospital staff were the same among participants, the third barrier differed among service members. Among the service members, 39% of those enlisted and 21% of officers reported that pain or previous medical conditions were a barrier to being physically active (Hearn et al., 2018). Understanding the barriers to physical activity expressed by military hospital service members enables the U.S. Army to mitigate the work-related negative influences associated with intrapersonal factors based on occupation.

Physical activity requirements in the military at a minimum include cardiorespiratory endurance and muscular endurance (high-repetition training). Military occupations in the United States military include fire and police rates, in which resaerch on Brazilian military members' physical activity rates differed. Cavalcante Neto et al. (2019) observed a higher frequency of physical activity among military police than Brazilian firefighters. Serving in the military can be dangerous based on military occupation, specifically those serving in combat and life-saving roles. The health of military police and firefighters is affected by occupational stress and dangers,

necessitating policies and interventions to maintain physical activity levels within the Brazilian military (Cavalcante Neto et al., 2019).

Further investigation into how instructional, community, and public policy factors related to military service influence interpersonal and interpersonal factors is needed. Hearn et al. (2018) noted that change in duty station (i.e., transient lifestyle), separation from family and friends, and comfortability are unique challenges for service members. Given the similarities among the other military branches, the U.S. Navy, U.S. Marine Corps, and U.S. Air Force can implement programs and services tailored to reducing barriers associated with physical activity.

Interpersonal Factors

Each military branch is unique, with compounding influences from the SEM affecting other factors in the model, such as interpersonal relationships. Interpersonal relationships are defined as the individual's formal or informal networks that support behavior (McLeroy et al., 1988). In the military, interpersonal factors can lead to influence from family members, coworkers, and friends.

Self-Reported Behaviors in the Military

Specific military branch environment and mission may influence the frequency of physical activity and body composition of military service members. The frequency of physical activity and the importance of maintaining an optimal body weight are directed by U.S. Department of War policy. U.S. Department of War policy requires each service to design a physical fitness and body composition test that indicates levels of combat readiness and operational mission requirements (U.S. Department of Defense, 2022c).

Military policy authorizes and requires military leaders to allow service members to participate in physical activity during the workday, depending on operational and mission requirements (U.S. Department of Defense, 2022c). Outside of operational and mission requirements, access to physical activity facilities and programs, as well as the perception of the benefits of physical activity on optimal health or occupation, may represent barriers. The physical activity barriers and habits during military service may perpetuate the influence across the SEM relating to physical activity.

Military leadership have flexibility in the requirements for physical activity frequency, components of the physical fitness test, and body composition maximums. General recommendations target service members maintaining optimal health remain a primary focus for fulfilling the overall mission of the U.S. Department of War. Compared to meeting the Healthy People 2010 recommendations of moderate or vigorous physical activity guidelines, Smith et al. (2013) found that 57.5% of service members met the recommendation, with approximately 49% of sailors reported have met the recommendation for physical activity. When compared to the Healthy People 2020 recommendations, the service members reported moderate physical activity exceeding the percentage reported by Smith et al., increasing the frequency of reported physical activity in the U.S. Department of War to 71.8%, above the 47.9% target for moderate or vigorous exercise (Meadows et al., 2021). When examining self-reported physical activity among U.S. Air Force personnel, Airmen aged 19 to 29 years reported a high frequency of physical activity, resulting in an increased prevalence of Airmen classified as overweight or obese (de la Motte et al., 2019). Although the frequency of physical

activity was self-reported, physical activity that including strength training can have a negative impact on BMI due to increased lean body mass. Consistent with Meadows et al. (2019) results for the U.S. Department of War, physical activity, and strength training frequency decreased in the U.S. Air Force between 19 to 29 and 30 to 39 years old.

Noticeable increases in screen time greater than 8 hours was also observed in both genders (19.4% to 29.3% in men, 30.1% to 37.8% women; de la Motte et al., 2019). Differences in the amount of screen time were reported based on military rank. Meadows et al. (2021) found that 32.8% of E1 to E4 service members reported spending over five hours in front of a screen compared to 22% of E7 to E9 and 13% of O4 to O6. Because the survey specifies screen time during leisure periods, the duties of senior enlisted and officers require greater administrative tasks using computers and mobile devices. Total screen time for these ranks would increase, representing a more significant amount of sedentary activity. The administrative duties for these ranks may cause a reduction in physical activity and an increased prevalence of service members who are overweight or obese.

Many factors may contribute to the increase in obesity in the military specifically Coronavirus Disease 2019 (COVID-19). COVID-19 was associated with reduced frequency of physical activity, globally. Park et al. (2019) noted a significant increase in sedentary behavior, as COVID-19 restrictions limited mobility and access to exercise. Specifically, within the U.S. Air Force, the self-reported effect of COVID-19 indicated a decrease in physical activity. Airmen reported that 21.8% experienced a significant reduction in physical activity, and 32.7% reported a decline in physical activity (Ligeza et

al., 2022). Reductions in physical activity frequency may be contributed to the prevalence of obesity due to COVID-19. Identifying the determinants of physical activity is crucial to correcting negative behavior changes in the percentage of service members who experienced weight gain during COVID-19. Service members classified as overweight or obese further increasing retiree and veteran obesity rates, requiring significant reinforcement of optimal physical activity and nutrition behaviors during a service member's military career.

Physical Activity Behaviors During Service and After

The Naval Health Research Center (n.d.) leads U.S. Department of War efforts to understand how military experience affects long-term health to influence military policy and reduce gaps in health care through the Millennium Cohort Study. Because the requirement to meet physical activity guidelines no longer exists following military service, Littman et al. identified changes in physical activity frequency before and after discharge among military personnel. Littman et al. (2015) observed a reduction in physical activity guideline compliance from 68.2% to 50.4% after discharge from the military. Factors contributing to the decrease in service members meeting the physical activity guidelines included birth, education level, ethnicity, and combat exposure (Litteman et al., 2015). Among the military branches, there was a 16-percentage point reduction from 65.4% in the U.S. Navy and U.S. Coast Guard, 17.4-percentage point reduction in the Army from 68.5%, and a 16.5-percentage point reduction in the Marines from 72.8% (Littman et al., 2015). The U.S. Air Force had the highest percentage change, from 69.4% to 90.1% in discharged military members, representing a percentage change

of 20.7% (Littman et al., 2015). Additionally, Littman investigated whether years of service affected the frequency of physical activity after discharge from service. Littman et al. (2015) did not observe an association between the length of service and meeting the physical activity frequency following military discharge. The lack of an association potentially contradicts the development of healthy behaviors among service members, further supporting the need for additional research on the barriers and determinants of physical activity within the military community. Providing services and programs that support the factors contributing to reduced physical activity during service and following military discharge helps veterans' health, as physical activity habits can be sustained, thereby reducing obesity-related health care expenses.

Workplace Physical Activity

Military service may involve less sedentary time due to physical readiness requirements. Characteristics such as military occupation and deployment status can contribute to a service member's sedentary behavior as previously indicated. The function of the U.S. Department of Defense (2020b) is to:

> Support and defend the Constitution of the United States against all enemies, foreign and domestic. Ensure, by timely and effective military action, the security of the United States, its possessions, and areas vital to its interest, and uphold and advance the national policies and interests of the United States. (p. 1)

Service members perform occupations and tasks similar to those of non-military individuals to meet their function. These occupations include administrative, combat specialties, construction, electrical, engineering, and health care. With reduced physical

activity levels in the military, the sedentary behaviors of service members may resemble those of individuals in private organizations although service members also serve in combat specialties, considered one of the more physically demanding military occupations. Quinn et al. (2020) evaluated the physical activity behavior of multiple professions indicating that manual labor (i.e., building/grounds/maintenance, construction and extraction) and food service occupations reported the highest amounts of light physical activity. At the same time, administrative workers had the most sedentary behavior during the day (Quinn et al., 2020). Some occupations involve more extended periods of sedentary behavior, Quinn et al. (2020) suggested that the occupational characteristics or recreational habits contribute to the moderate-to-vigorous activity reported. Sedentary behaviors based on occupation have the potential to influence the physical activity habits within the military, as there are similarities in the functions performed in non-military occupations.

Institutional Factors

The exosystem encompasses the organizational qualities of the command and U.S. Department of War policy and regulations, with military and United States cultural values contributing to the macrosystem level of the SEM (Trego & Wilson, 2021). Commands contribute to the overall mission of the military and are expected that the levels of physical activity during and post-service may fluctuate based on military occupation, as work demands and lifestyles shift. McLeroy et al. (1988) identify the organizational level as contributing to health promotion behaviors and the influence an organization has on long-term behavior changes. Organizational characteristics can both

positively and negatively affect ideal health behaviors, depending on operational requirements (e.g., workload, deployments), work-related stress, and economic and social resources (McLeroy et al., 1988). Because the community represents the exosystem within the SEM, community health care providers and the level of health engagement impact the ability to meet the health needs of veterans and their dependents (Lubens & Bruckner, 2018).

The U.S. Department of War is an organization that functions similarly to non-federal corporations, establishing goals and objectives impacted by the health-related behaviors of its employees. With a mission to protect America from foreign and domestic threats, the U.S. Department of War's mission is accomplished by trained and qualified service members responsible for the execution of missions in the air, ground, operations, and sea (USAGov, 2025). Both the joint chiefs of staff chairmen and service senior ranking officers acknowledge the importance of health behaviors through policies that support the service member's physical readiness and contributions to the military's goals and objectives.

U.S. Department of War policy establishes the framework and offices for physical readiness-related health behaviors across multiple health-enhancing domains. The joint chiefs of staff's, Total Force Fitness Framework provides components for service members to enhance their physical performance through aspects of the mind, body, and spirit. The conceptual framework outlines and directs programs and services to enhance operational readiness by addressing the overall health of service members across multiple domains (Chairmen of the Joint Chiefs of Staff, 2011). The Total Force Fitness

Framework acknowledges the contributions of the workplace stressors identified in the theoretical framework of the physical workplace environment as a conceptual framework (see Badayai, 2012). The health and well-being of service members may be influenced by three categories of workplace stressors: catastrophic events, minor events, and daily/regular tasks, as part of the workplace environment. As a result, Total Force Fitness Framework requires military leadership to support activities that optimize the overall wellness of the service member through behavioral, social, physical, environmental, medical/dental, spiritual, nutritional, and psychological factors to support readiness (Chairman of the Joint Chiefs of Staff, 2013). Although all domains influence physical readiness, the Total Force Fitness Framework identifies the physical fitness domain and the relationship physical activity has on mission readiness and overall health (see Chairman of the Joint Chiefs of Staff, 2013).

With the introduction of the Total Force Fitness Framework, a shift in military culture with an emphasis on a holistic approach to fitness and readiness is supported and emphasized by U.S. Department of War leadership. Jonas et al. (2010) recognized that trauma and experiences impact service members' health and overall wellness. Additionally, the Total Force Fitness Framework is grounded in the Military Demand-Resource Systems model, which identifies psychological factors that influence the physical readiness of service members (Bates et al., 2013). Components of the Military Demand-Resource identified by Bates et al. (2013) include demands, outcomes, resources, and the balance between demands and resources. The multiple factors associated with military service contribute to the need for programs and services that

support resources provided to service members. Each total force fitness domain: physical, psychological, social, spiritual, and environmental, are supported by a demand associated with military service and resource availability. Bates et al. (2013) acknowledged individual or command resources that are internal and external, impacting fitness. The availability of the demands and resources across the total force fitness domains may contribute to the physical activity trends of service members. Regarding total force fitness outcomes, two categories are identified: resilient behaviors and performance. Resiliency-based behaviors include destructive behaviors (e.g., attempting suicide, binge drinking) and performance behaviors like formal and nonformal job performance (Bates et al., 2013).

The inception of the Total Force Fitness Framework emphasized the need for each total force fitness domain, as the factors of another domain can enhance one domain, such as the SEM. Within the military there is an emphasis on integrating mind and body components to improve the service member's fitness. Because the U.S. Department of War has emphasized the need for physical fitness, a cultural shift identified within the total force fitness framework may provide enhanced fitness and healthy behavior habits. These habits could contribute to long-lasting behavior patterns, reducing the prevalence of not only service members but also veterans who are obese or overweight. Shifting from a culture of physical readiness testing to one that supports overall fitness can enhance military performance, as the total force fitness domains are intertwined. Physical fitness can be enhanced by psychological factors, which are influenced by nutritional factors (Joans et al., 2010).

Physical activity is essential in the military to accomplish its mission. The reduction in determinants of physical activity and the establishment of a culture of fitness may impact service members' ability to be physically active throughout their careers and beyond. Holtermann et al. (2021) suggested that integrating physical activity initiatives into the workday can lead to reduced health care expenses and improved employee productivity. Dall et al. (2007) identified a $61 million expense related to enlisted recruits discharged before the end of their first contract. Discharge was due to service members exceeding the U.S. Department of War's maximum body composition standards. These expenses do not include investment in military officers due to weight-related separation. Improved integration of physical activity determinants and barriers within the military may reduce health care expenses, improve retention and productivity during service, and decrease obesity-related comorbidities among military veterans.

U.S. Department of War Physical Fitness and Body Composition Policy

U.S. Department of War policy outlines the requirements for the leadership of each military branch (e.g., U.S. Marine Corps, U.S. Navy) to establish physical fitness and body composition programs. Policy regarding physical training requires physical fitness testing and training that support mission readiness and promote optimal health (U.S. Department of Defense, 2022c). Additionally, policy outlines remedial physical fitness programs that focus on improving physical fitness, nutrition, and health behaviors for service members who exceed physical readiness standards (U.S. Department of Defense, 2022c). Remedial fitness programs offer an opportunity to enhance health behaviors through increased participation in physical activity and nutrition education.

The physical readiness test established by the U.S. Department of War includes body composition measurements and physical fitness tests. When using determining body composition, prior to January 01, 2026, the U.S. Department of War authorized military branches to assess body composition using maximum values based on height-weight, abdominal circumference, or waist-to-height. When body fat calculations are used, the maximum allowable body fat percentage is 26% for men and 36% for women (U.S. Department of Defense, 2022c). When height-weight were used to determine body composition, the maximum permissible weight cannot exceed a BMI of 27.5 (U.S. Department of Defense, 2022c). Subsequently, the U.S. Department of War updated the military fitness standards for body composition requiring military branches to us waist to hip ratio to assess body composition starting in 2026. Tata (2025) further instructed senior pentagon leadership, combatant commanders, and military field activity directors service members with a waist to hip ratio greater than 0.55 will require further body fat evaluation, maintaining the maximum allowable body fat for men (26%) and woman (36%).

Personal and Unit Physical Training

Among the U.S. Department of War, the U.S. Navy is the only service that specified a specific frequency for physical activity in its physical readiness instructions, expanding upon the requirements outlined in Department of Defense Instruction 1308.03. With the military branch with the highest prevalence of service members classified as overweight or obese, the U.S. Navy indicates 150 minutes of physical activity per week, two to three days of strength training, two to three days of neuromuscular exercise (i.e.,

20-30 minutes), and two to three days of flexibility training (U.S. Navy, 2025). Before the release of the Secretary of War's Combat Arms Standards, the U.S. Navy administratively separated sailors who failed two physical fitness assessments within a three-year period. The halt in separation may have contributed to a greater emphasis on U.S. Navy sailor's maintaining compliance with body composition and physical readiness standards. The U.S. Navy's recommendation aligns with the physical activity guidelines published by the U.S. Department of Health and Human Services. When the physical activity guidelines are met, the U.S. Department of Health and Human Services (2018) states benefits include improved weight control, weight loss, and an enhanced quality of life. Despite the known benefits and incorporation of physical activity into U.S. Navy policy, most sailors fail to meet the recommendations, resulting in the U.S. Navy having the highest prevalence of obesity in the military (27%; Meadows et al., 2021).

As the U.S. Marines have the lowest prevalence of obesity, Marine Corps Order 6100.14 sets the requirement for physical training to be incorporated into the Marines' daily schedule, with strength training conducted a minimum of twice per week in addition to cardiovascular activity (U.S. Marine Corps, 2018). The U.S. Air Force manual does not indicate the frequency of physical activity for Airmen. The manual sets the requirement for a branch to have a culture that supports healthy lifestyles and the administration of the Service's physical and occupational-specific fitness assessments (U.S. Department of Air Force, 2022). The U.S. Department of the Air Force (2022) physical fitness assessment incorporates muscular strength, core endurance,

cardiorespiratory fitness, and mission-specific training to promote self- and unit-based physical activity participation.

The U.S. Army has one of the military branches' most comprehensive physical readiness training manuals. The U.S. Army field manual (FM 7-22) established the Department's Holistic Health and Fitness (H2F) System, which supports Soldier readiness through physical and non-physical military readiness components across five readiness domains: physical, nutritional, spiritual, mental, and sleep (U.S. Army, 2020). When specifically searching for physical requirements, the manual indicates that the soldier's physical activity should be work-specific, supported by the environment and staff (U.S. Army, 2020). The existence of military policy provides support and a framework for service members to maintain appropriate levels of physical activity. The policies within each branch establish the requirements not only for the service members but also outline supportive elements (e.g., facilities, resources, staff) that assist in reducing barriers to physical activity and readiness.

With each military branch mandating different physical readiness tests, performance outcomes may vary depending on the unit and the individual's physical training frequency. In the U.S. Army unit, physical training supports the service member's military occupation, health, and mission readiness (Anderson et al., 2017). Army soldiers can perform individual physical training to support their aspirations or further support their military readiness with command physical training providing an opportunity to meet the minimum physical readiness requirements. When evaluating top performances on the Army Physical Fitness Test, men and women who performed the

best participated in individual distance running and resistance training with performers having lower BMI scores (Anderson et al., 2017). The performance level and BMI may be attributed to the high mileage and volume of resistance training performed by soldiers. Anderson et al. (2017) noted that the military's culture of early command physical training leads to less motivated service members, whereas individual physical training is more conducive to the goals of military members.

Military and Veteran Challenges and Opportunities

Although serving in the U.S. military can be perceived as patriotic, military service can come with challenges that contribute to or create health disparities. Haibach et al. (2017) noted that in veterans, health disparities are due to health behaviors pre- and post-military service. Efforts to address health disparities require focusing on the service member. The minimum health and physical fitness standards must be met before an individual can enlist or be commissioned as an officer. As a result of these requirements, military recruits are considered healthier than their peers (Haibach et al., 2017). During military service, service members access facilities and resources provided by the U.S. Department of War. In contrast, veterans and retirees have access to the U.S. Department of Veterans Affairs after their obligated service. Access to U.S. Department of War resources is maintained for veterans and retirees who retired from active duty or military reserves (with 20 years or more of service) and for veterans with a 100% service-connected disability or who have received the Medal of Honor. The U.S. Department of War and the U.S. Department of Veterans Affairs work together to enhance the health of the military community through the Military Health System and the Veterans Health

Administration. Specifically, veterans who use the Veteran Health Association are minorities, both racial and ethnic, are of a lower social standing or class, lack housing, or have diagnosed comorbidities (i.e., medical, psychological; Haibach et al., 2017).

Male and Female Active Duty and Veteran Health

During military service, health indicators and behaviors were observed in the military, veteran, and civilian male and female populations by Hoerster et al. After military service, male veterans reported fair or poor health status and poor physical health resulting from physical or mental health issues (Hoerster et al., 2012). Furthermore, the male veterans reported being physically inactive, increasing the likelihood of being obese compared to active-duty members, even though active-duty males were more likely to be overweight (Hoerster et al., 2012). Female veterans were more likely to be overweight or obese than active-duty females due to greater access to health care and exercise reported by active-duty females (Lehavot et al., 2012). It is unknown if mental and physical health status in male veterans contributes to obesity and physical inactivity in veterans, or how the levels of the SEM contribute to physical activity behavior. Military and veteran health professionals with access to current health-related data can contribute to prioritizing intervention efforts within the U.S. Department of War and U.S. Department of Veterans Affairs (Hoerster et al., 2012; Lehavot et al., 2012).

Influences during military service may have a positive or negative impact on the health of veterans. These influences, behaviors, and availability of services and programs can contribute to the prevalence of veterans who are overweight or obese. Although multiple behaviors can contribute to increased weight, behaviors that reduce these risks

include regular physical activity, a reduction in junk food intake, and adequate sleep (Ramsey et al., 2023). Unhealthy behaviors (i.e., physical activity, sedentary time, fast-food consumption, sleep duration, smoking status, and alcohol use) may be attributed to veteran weight status and association to caloric consumption and physical activity (Ramsey et al., 2023). These unhealthy behaviors may have emerged during military service, identifying areas of health behavior that the U.S. Department of War should focus on. As specific veteran groups maintain access to military installations that support healthy behaviors, these services and programs may contribute to optimal health behaviors in veterans. Unlike those with military installation access, the programs and services offered may not have long-lasting effects intended to support and promote physical activity, and require an evaluation of the current military structure to influence health behavior during military service. An emphasis on the benefits of physical activity and reduced sedentary behavior can potentially lower a veteran's risk of being overweight or obese.

Community

The institutional or macrosystem-level predictors of health include the services provided and unit cohesion that lead to gaps in care, inadequate treatment, and capacity within the U.S. Department of War and the U.S. Department of Veterans Affairs (Lubens & Bruckner, 2018). McLeroy et al. (1988) identify the community based on social groups, mediating structures, organizational relationships within a specified area, and power structures. The U.S. Department of War and its independent branches can be considered a community or compartmentalized into subgroups/communities. Mediating

structures, such as informal social networks and military installations, influence a service member's beliefs and attitudes (McLeroy et al., 1988). Trego and Wilson (2021) stated that military installations support behaviors within the community by providing housing, medical facilities, grocery stores, food establishments, fitness facilities, and other recreational and family support services. To promote, support, and reinforce esprit de corps and the service member's quality of life, Morale, Welfare and Recreation provides physical activity programs and facilities (e.g., fitness, aquatics, sports; U.S. Department of Defense, 2011). Morale, Welfare and Recreation facilities associated with physical activity are directed to support the military mission through activities that enhance the physical and mental health of the community, contributing to the Total Force Fitness metrics and physical fitness/body composition standards. Influence from the community requires coordination among the service providers and stakeholders, potentially forming special interest groups to cultivate positive health behaviors (McLeroy et al., 1988).

After military service, policies and cultural attributions influence access to and support for service members' health behaviors, extending even after they transition to a veteran status. The health predictors and associated health outcomes can lead to reductions in physical activity and improper nutrition behaviors, resulting in an increased prevalence of service members and veterans who are overweight or obese. Based on the number of years served (i.e., retirement) or type of military separation (e.g., combat-related discharge), the community resources provided by military installations remain accessible. Total Force Fitness is a framework that transcends the different levels of the SEM; therefore, support for unit fitness is based on multiple assumptions. Influences on

fitness within the military unit are the social environment, the dynamic and connectedness of the unit, the leader's support and contribution to the unit's culture, and esprit de corps (Bates et al., 2013).

Environmental correlates exist when evaluated in conjunction with physical activity. In research, neighborhood design and the network and pattern of streets are correlated with physical activity outcomes, specifically the transportation environment and leisure activities (Mema et al., 2012). These correlates may contribute to the levels of physical activity, as the environments of service members may lead to reduced physical activity trends. Service members can work and live on military installations, which are generally independent locations within and outside the continental United States. These military installations offer facilities and resources in typical neighborhoods, including food establishments (e.g., convenience stores, fast food restaurants, grocery stores), support service facilities, housing, and recreation facilities (e.g., parks, athletic fields, fitness centers). Mema et al. (2022) found that the maintaining frequency of physical activity in adults is linked to the environment, convenience, recreation facilities, and participant involvement as contributors to increased physical actgivity.

Additional environmental factors can influence physical activity behaviors and the ability to perform independent physical training. Yoongu and Sanghyun (2021) indicate that demographic characteristics (i.e., sex, age) and education influence physical activity, with males reporting a higher frequency of activity than females, even after accounting for age. To support physical activity in service members and veterans, removing socioeconomic barriers and improving social networks can improve physical

activity behaviors (Yoongu & Sanghyun, 2021). Within the military and veteran communities, a greater emphasis is needed to enhance the physical environment of the installation to support physical activity behaviors. The improved social and physical environment may enhance self-efficacy across the SEM, thereby reducing the prevalence of obesity among military members and veterans.

Public Policy

Public policy is vital component of physical activity frequency. Through policy, communities like the U.S. Department of War can influence and direct the behaviors of its members. The U.S. government and the U.S. Department of War have established policies to improve and support physical activity behaviors. Because there are multiple stakeholders, policymakers successfully implement policies through partnerships to improve the environment and alignment of resources that may contribute to physical activity.

To promote optimal health outcomes, the U.S. Department of Health and Human Services' Office of Disease Prevention and Health Promotion publishes physical activity guidelines for Americans. Specifically for adults (18 through 64) and older adults (65 and older), the guidelines aim to prevent obesity and other behaviors related to sedentary behavior, such as reduced cancer risk, improved brain function, and lower all-cause and disease-specific mortality (Office of Disease Prevention and Health Promotion, n.d.). The Office of Disease Prevention and Health Promotion (n.d.) indicates that adults and older adults should perform a minimum of:

- aerobic exercise between 150 minutes and 300 minutes of moderate-intensity, 75 minutes to 150 minutes of vigorous-intensity exercise, or a combination weekly
- muscle-strengthening activities that involve major muscle groups twice per week
- balance training for older adults

The identified recommendations align with military policy; however, current policy further emphasizes the relationship between regular muscle strengthening, balance training, and aerobic exercise in preventing disease and illness.

Summary and Conclusions

Chapter 2 presented an overview of the SEM that identifies multiple levels of influence on health behaviors. The multiple levels of influence contribute to physical activity among service members and veterans, contributing to negative health outcomes, with the military experiencing increases in the prevalence of obesity. Additionally, previous and current peer-reviewed literature, as well as government resources, further expand on the requirements and influences on physical activity. A review of military community trends and influences within the military community was included in the SEM. Additionally, barriers and determinants were included among the SEM's levels to support the need for additional investigation of physical activity behaviors within the military community.

Given the increased prevalence of obese veterans and service members, further investigation is required on the determinants of exercise. A heavy emphasis is placed on

physical readiness among service members, with regular requirements for physical fitness testing. These requirements and the associated resources support optimal physical activity and help service members maintain ideal body weight. The identification of exercise determinants enables improved physical activity behavior by reducing these factors and positively enhancing physical activity.

Chapter 3: Research Method

This chapter describes the research methods used to explore the military's influence on physical activity behavior within the U.S. Department of War. Influence on physical activity behavior within the military community may be enhanced or impeded based on multiple ecological levels. Current service members have unique requirements that promote physical readiness, reducing the prevalence of service members classified as overweight or obese, further improving the weight classification of veterans. The study aimed to enhance the understanding of the impact of physical activity on service members and veterans through a quantitative investigation. This chapter describes the variables, data collection design, research design sample, data analysis, and human subject protection. A summary is provided at the conclusion of the chapter.

Research Design and Rationale

This quantitative study aimed to identify the determinants that may influence physical activity behaviors in service members and veterans. In a nonexperimental quantitative design, the SEM's interpersonal, intrapersonal, organizational, community, and policy levels provided the theoretical framework for identifying office-related determinants of physical activity while serving in the military. The factors influencing behaviors may include military leadership and stakeholders' efforts to sustain, enhance, or revise policies, as well as education and services. Because installations and commands are directed to provide physical activity opportunities, the percentage of service members overweight or obese continues to increase. Using surveys to capture the opinions and

attitudes of the military and veteran population allowed for data to be analyzed, resulting in the description of the determinants of physical activity within the military community.

This descriptive study aimed to describe the characteristics associated with the frequency of physical activity among individuals affiliated with the U.S. military. Using a descriptive methodology allowed for identifying what office-related determinants of physical activity exist within the military. Due to an ecological study design, findings may expose an association between determinants and the associated outcome (see Aggarwal & Ranganathan, 2019). In the current study, the work-related determinants, as outlined in the framework of the SEM, exert a level of influence on the frequency of physical activity. Because an association between food intake and physical activity is necessary to prevent obesity and improve quality of life (Niemiro et al., 2023), it was essential to identify the determinants of physical activity to reduce the prevalence of overweight or obese service members and veterans.

The descriptive design had both advantages and disadvantages, which contributed to various time and resource constraints. A descriptive design had been associated with ease of execution, allowing for data collection within a single instance, less ethical scrutiny, and the ability to estimate the disease impact (see Aggarwal & Ranganathan, 2019). Within the design, data may identify relationships within the military population and/or specific to the unique culture of the branch that represent connections that deter physical activity frequency. Additionally, Aggarwal and Ranganathan (2019) suggested that descriptive designs facilitate additional hypothesis testing through more complex

research designs. Using a descriptive design allowed for future research exploration concerning specific determinants and research methodologies.

The descriptive design is consistent with health-related research, as it allows for the collection of data that can describe a relationship between an outcome and behavior. For work-related determinants of physical activity, the descriptive design provided population-level data concerning exercise frequency, BMI, and exercise determinants. Using the OEBD scale, IPAQ, and sociodemographic questions, the descriptive data identified correlations between the influential levels of the SEM and physical activity. The frequency of physical activity and prevalence of obesity in the military aligned with descriptive designs, assessing how various work-related elements influenced exercise habits. Applying the descriptive design to identify specific determinants provided valuable insights into the intrinsic and extrinsic motivators, as well as the social and work environments. Determinants found to be statistically significant signal to the military to take action on reducing barriers and influences on office-related exercise behaviors through policy, an improving the environment, expanding benefits, or cultural shifts that support exercise-related motivators.

This descriptive design involved multiple independent variables, with frequency of physical activity serving as the dependent variable. Physical activity determinants were the dependent variables that influence participation and frequency of physical activity (i.e., independent variable). Dependent variables included motivation (both intrinsic and extrinsic) and environment (both social and work-related). The research also contained moderators for the frequency of physical activity. With unique missions for each military

branch, it may covariate as the variable affects the frequency of physical activity and the significance of the office-related exercise determinants. Like the military branch, military occupation and rank can influence exercise frequency, as specific military occupations have increased physical requirements. Military rank was also a covariate variable, as it affects the frequency of physical activity and the determinants due to the responsibilities, education, and duties associated with enlisted versus officer ranks. With the identified variables and descriptive design, comparisons of variables validate necessary changes within the military to improve physical activity behaviors, reduce office-related determinants of exercise, and decrease the prevalence of service members who are overweight or obese.

Methodology

Population

The target population for this research was current and former U.S. Department of War service members. Active-duty members fulfill their obligated service when enlisting or being commissioned as an officer. Service members' obligation depends on factors like military occupation, attending a Service Academy, or participation in a special program. Military obligation requires eight years of service, with the service Secretariat having the authority to reduce the obligation to six years (U.S. Department of Defense, 2021). The minimum obligated service exposes active-duty members to environments and programs/services that may inhibit or enhance the service member's quality of life. Following their obligated service, service members can extend their obligation until retirement or separate from military service. After 20 years, service members are eligible

for retirement, collecting a pension and maintaining higher benefits, such as health care and access to mission-sustaining programs (e.g., fitness centers, aquatics facilities, libraries).

The population included responses from the current members of the U.S. Army (i.e., Soldiers), U.S. Air Force (i.e., Airmen), U.S. Navy (i.e., Sailors), U.S. Marine Corps (i.e., Marines), and U.S. Space Force (i.e., Guardians) and retirees from each respective branch. Defense Manpower Data Center (2025) reported the military population consists of 447,455 Soldiers, 339,602 Sailors, 170,849 Marines, 315,317 Airmen, and 10,205 Guardians. In addition to the current U.S. Department of War service members, the U.S. Department of Veterans Affairs (n.d.b.) estimates that by September 30, 2026, the number of living veterans by branch will be 7,516,409 Soldiers, 3,585,634 Sailors, 2,015,054 Marines, and 2,962,736 Airmen, with Guardian population not available. The total service members and veterans population is estimated to be 17,363,261.

Sampling and Sampling Procedures

Convenience sampling was the method used to collect data, based on the estimated size and accessibility of the population. Convenience sampling was used due to restrictions and protocols required to conduct research or obtain data on service members. Although the survey instrument used to collect service member data is an excluded activity as it identifies determinants of physical activity behavior as outlined in U.S. Department of War instruction 3216.02, conducting surveys requires coordination and sponsorship with the military components (e.g., Navy Survey Program Office, Army Internal Review Board).

With a convenience sample, the research findings were generalized to the sample due to the non-probability nature of the sampling method (see Andrade, 2021). Using the non-probability method, Althubaiti (2022) stated that sample size estimation is irrelevant in relation to issues with generalizability. However, strategies are needed to ensure data is credible, with the limitations identified when using a convenience sample. It was imperative that credibility is maintained when using convenience sampling. Stratton stated that credibility is improved by stating concise research objectives, including detailed inclusion and exclusion criteria, selecting a representative sample, offering convenient data collection methods, and using validated instruments. Understanding that the ability to generalize the findings and the information obtained, if trustworthy, would allow targeted improvements in the fitness culture within the military or further investigation into exercise determinants.

Procedures for Recruitment, Participation, and Data Collection

Service members and veterans were recruited through a partnership with Stars and Stripes. As an independent news outlet, Stars and Stripes focuses on the U.S. military and veterans, regularly publishing printed newspapers and online media with a reach of 1.4 million (Stars and Stripes, n.d.). Facts and figures depict the disruption of over 9.8 million editions between the United States and special editions (Stars and Stripes, n.d.). In addition to the publications, Stars and Stripes (n.d.) delivers news and information through a delivery of digital editions of over 250,000, 26 million mobile application views, 14 million through the stripes.com website, including 700,000 for Europe- and Pacific-specific websites, 14 million unique visitors, and 1 million social media

followers. Because the U.S. Department of War does not endorse the research, the partnership with Stars and Stripes provides access to the military community, which would traditionally be restricted or limited. Stars and Stripes is independent of the U.S. Department of War, although a product of the Defense Media Activity, with funding from the department to print and distribute the publication internationally, focusing on the readiness of service members (Stars and Stripes, n.d.). The publication's focus on military readiness further supports the partnership, as there is a link between physical readiness and mission readiness and performance.

SurveyMonkey was the platform used to obtain responses from participants. No personally identifiable information is not required from research respondents with demographic questions providing minimal information. Demographic questions included gender, marital status, race, age, and military occupation. Military occupation questions consisted of the participant's branch and status (i.e., active or retired), occupation specialty, and rank. Through the platform, participants acknowledged their consent to participate in the study before participating in the research. The informed consent included participants' understanding that their responses are voluntary, the associated risks and benefits of their participation, a privacy statement, and contact information in case the participant has any questions. Additionally, participants were informed that the research was not affiliated with the U.S. Department of War and that military organizational leaders and stakeholders may use their responses to inform improvements in physical activity behavior, policy, and the associated environment.

Instrumentation and Operationalization of Constructs

Developed by Zhang, Ham, and Ren, the OEBD scale assesses work-related determinants of physical activity. The OEBD scale aims to identify influences on exercise behavior within the workplace, potentially supporting organizational interventions associated with physical activity. The development of the OEBD scale incorporated multiple frameworks, models, and theories from health, behavior, and environmental perspectives. To determine the office-related determinants of physical activity, Zhang et al. (2021) applied the "Theory of Planned Behaviour, the Self-Determination Theory, Self-Efficacy, the Transtheoretical Model, and the Health Belief Model" (p. 2) for the identification of individual characteristics and the SEM for environmental determinants. Individual behavior and environmental determinants identified in the OEBD scale initially identified the potential of 18 determinants, including perceived behavioral control, perceived health, family and friend influence, social support, exercise facilities, and organizational policy (Zhang et al., 2021). The initial 52-item scale was developed by adapting existing measures and creating context-based measures to construct the questionnaire (Zhang et al., 2021).

Zhang et al. collected data responses from two parts, including the OEBD scale (part one) and questions about physical activity frequency (part two). To assess the OEBD scale, part one incorporated the OEBD scale, measured using a 7-point Likert scale, and adapted exercise intention questions using a 4-point Likert Scale. Part two of the validation process included measures of exercise frequency (i.e., Godin-Shephard Leisure-Time Activity Questionnaire), occupation, and demographic information.

Responses were obtained from 479 individuals who worked more than 30 hours, were employed in locations other than at home or outdoors, and did not provide conflicting responses (Zhang et al., 2021). Following the data analysis, the OEBD scale was reduced to 32 items. The factor analysis by Zhang et al. (2021) yielded loading and communality values greater than 0.5, no cross-loading, and a substantial cumulative contribution rate. The intercorrelation indicates the OEBD scale is reliable.

The OEBD scale comprises four factors: intrinsic motivation, extrinsic motivation, social environment, and work environment, based on factor structure investigation, scale structure assessment, and exploratory analyses (Zhang et al., 2021). Zhang et al. (2021) demonstrate OBED's interpretability with each factor of the four-factor solution, yielding a Cronbach's alpha ranging from 0.84 to 0.94. Additionally, the four-factor solution accounted for a cumulative variance percentage of 60.46% and exhibited a substantial total variance (eigenvalue of 2.25). Permission to use the OEBD scale was granted through email correspondence from all listed.

Data Analysis Plan

Data analysis used the Statistical Package for the Social Sciences (SPSS) by International Business Machines (IBM) to identify the significance of the office on exercise behavior. SPSS version 30, provided by Walden University, allowed the statistical analysis to predict outcomes related to physical activity determinants associated with military service. Data cleaning was required to ensure only applicable responses are included. Data cleaning followed the screening, diagnosing, and editing process identified by Van den Broeck et al. (2005) when abnormal responses are observed. SPSS

provided the statistical tools necessary to objectively and systematically screen the data. The key to filtering the data included identifying the data's distribution, relationship strength, and the specified screening criteria (Van den Broeck, 2005). Veterans and active-duty military personnel were the only data included for analysis. Responses from any other groups were not included, as the research aims to identify office-related determinants of exercise within the military and veteran populations. The screening criteria aided in reducing the diagnostic phase of data cleaning. During the diagnostic phase, data were cleaned and excluded when determined to be erroneous, extreme, or illogical. Following the diagnostic phase is the treatment of data, which allows for correction when the actual data was found, improving research validity (Van den Broeck, 2005). The data cleaning and screening for this research are essential to identify determinants of significance that influence physical activity among service members and veterans.

This study includes five research questions and their associated hypothesis tested:

RQ1: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency?

H_{01}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency.

H_{a1}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency.

RQ2: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI?

H_{02}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI.

H_{a2}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI.

RQ3: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI?

H_{03}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI.

H_{a3}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI.

RQ4: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI?

H_{04}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI.

H_{a4}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI.

RQ5: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI?

H_{05}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI.

H_{a5}: There is a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI.

Descriptive and inferential statistical tests were used to analyze the data obtained. The use of descriptive statistics allowed for the data to be presented in a manner that is logical and meaningful, providing a summary of the study's sample and the associated survey responses that include the summary of the measures of central tendency, measures

of variability, and response frequency and percentage. Inferential statistics included t-test, multinomial logistic regression, and multiple linear regression. The t-test enabled a determination of whether there was a statistically significant difference between two groups (see Wadhwa & Marappa-Ganeshan, 2023). Groups for comparison within the study included a comparison of means based on gender, military affiliation (i.e., active, retired), and military role (i.e., enlisted, officer). Regression was used to determine if a relationship exists between the dependent variable and the independent variables. With multiple independent variables within each research question (e.g., military branch, military status, rank, gender), multiple linear regression determines the contribution of the predictor variables within the model (see Laerd Statistics, n.d.).

Using multiple linear regression, the data collected must meet the eight assumptions, supporting the validity of the research results. The eight assumptions, as indicated on Laerd Statistics (n.d.), are

- The dependent variable is measured on a continuous scale.
- There are more than two independent variables that are continuous or categorical variables.
- There is independence of residuals.
- A linear relationship exists between the independent and dependent variables.
- The data reflect homoscedasticity.
- There is multicollinearity in the data.
- There is an absence of outliers or points that are significant or influential.
- The data distribution is normal.

Using multiple linear regression created a model that included a value that can predict the dependent variable. Within the research aim, multiple linear regression assesses the strength of the determinants of military rank, status, occupation, gender, race, and physical activity (e.g., intrinsic factors, social environment, work environment) in explaining BMI. Adequate power was necessary to reject the null hypothesis for each research question when using multiple linear regression. Based on the parameter choices used in G*Power 3.1, with a desired significance criterion of $\alpha = 0.05$ and a power of 0.80, the minimum sample size needed is $n = 103$. The determined significance criterion and power are identified as commonly used values to estimate sample size (see Das et al., 2016). Additionally, the sample size was determined based on the seven predictor variables: military branch, military rank, military occupation, military status (i.e., veteran, retiree, active-duty military), gender, race, and OEBD scale.

Threats to Validity

As defined in Creswell and Creswell (2018), validity refers to the extent to which the data gathered is significant in obtaining knowledge about a population from a sample. Additionally, validity refers to the reliability of the observation or experiment in measuring the construct, supported by the research methodology and the accuracy and interpretation of data gathered from the research instrument (see Sullivan et al., 2009). External, internal, and construct validity are the three areas that need to be established to ensure the research findings can contribute to positive social change and military members' overall health and wellness.

External Validity

With external validity, the research findings can be generalized for the intended or like population (see Sullivan et al., 2009). External validity allows the research findings to influence physical activity behaviors within the military across multiple levels of the SEM. Steckler and McLeroy (2008) emphasized the need to prioritize external validity in public health programs to support the effectiveness of programs for various populations or environments. Efforts to address external validity include the recruitment, selection, and representation of research participants, the implementation of policies or programs, and the outcome of the associated ideal behavior (see Steckler & McLeroy, 2008). A sound research methodology aids in reducing threats to external validity, which include sampling bias, history, the Hawthorne effect, observer bias, and testing effect.

Sampling bias and history were two threats to external validity, as the intended research involves the distribution of the OBED scale and sociodemographic questions. Hawthorne effect, observer bias, and testing effect are not threats to external validity, as the research will use a survey for data collection. If the research design was experimental, the Hawthorne effect, observer bias, and testing effect were due to changes in participant behavior when being observed, the influence a researcher has on participants, or the desire of participants to impact the outcome (see Bhandari, 2023a). One threat to external validity was sampling bias. Chen et al. (2021) noted that the data collection method (i.e., telephone survey, web-based survey) can lead to sampling bias. Although this threat exists, considering the practical factors associated with data collection, disseminating

web-based surveys allowed for an extensive and convenient reach of the target population.

Internal Validity

Multiple sources should be investigated to establish internal validity concerning this research. According to Babbie (2021), history, maturation, testing, instrumentation, statistical regression, selection biases, experimental morality, and demoralization are sources of internal invalidity. With internal validity, the research findings accurately reflect the population, thereby indicating a level of truthfulness that allows the researcher to draw conclusions based on the results (see Patino & Ferreira, 2018). Of the sources that can determine internal validity, testing, statistical regression, maturation, experimental mortality, and demoralization are not considered threats to internal validity. These sources are not threats due to the nature of the research.

Babbie (2021) defined testing as a threat to internal validity because the research method selected does not use a pretest-posttest design. Responses to the OEBD scale will be observed at the current point without being remeasured following an intervention aimed at improving exercise behavior. Statistical regression also does not threaten internal validity, as the research is not experimental but instead follows a descriptive design. In experimental designs, Baddie (2017) indicated that statistical regression threatens internal validity due to interference from extreme scores following an initial assessment, similar to experimental mortality, which involves a reduction in participation and reduces the researcher's ability to compare results and draw a conclusion. As a descriptive research, design maturation was not considered a threat to internal validity.

Maturation influences outcomes over time, such as changes in sociodemographic status since the start of the research (see Baddie, 2017). This research's internal validity threats were history recall and selection biases.

Within the military setting, history may become a threat to internal validity. Events within the military community may impact the participant's responses to the OEBD scale. Deployments and duty changes may influence responses to the social environment and work environment components, depending on when the questionnaire is completed. History poses a greater threat to internal validity in experimental research; it can also influence the social and work environments. Reducing the systematic error associated with selection bias was essential to reduce internal invalidity. Selection bias occurs when there is a systematic difference between the target population and the sample (see Baddie, 2017). Responses to this research targeted current and former service members only. Questions concerning military affiliation (e.g., military occupation, rank) helped eliminate responses from non-military members. As a descriptive design, a causal relationship was not explored, reducing the overall threats to internal validity. The implications of the research findings require ecological validity. The results can be applied to military commands with ecological validity by identifying the determinants that impact office-related exercise behavior.

Construct Validity

Construct validity ensures the research's accuracy through the validation of the measurement procedure (see Bhandari, 2023b). Because the work environment may contribute to exercise behavior, the assessment of determinants within this environment

will include a questionnaire that measures physical activity behaviors and the OEBD scale. Further construct validity contains two subtypes: convergent validity and discriminant validity. When exploring convergent validity and discriminant validity, convergent validity refers to the correspondence of the construct with other variables and measures (see Bhandari, 2023b). In contrast, discriminant validity refers to a relationship with a high correlation between unrelated constructs and the construct being examined, where the latter is not highly related (see Bhandari, 2023b). Construct validity is associated with the logical relationship among the theoretically linked characteristics being investigated (see Babbie, 2021). It is necessary to address the related threats to construct validity to support the accuracy of what is being measured. The construct validity threats include the adequacy of operational definitions, mono-operation bias, mono-method bias, reduced levels of measurement of constructs, and construct confounding.

The research constructs included the demographic and military occupation details from the service members and the military branches, with the constructs aligning with the SEM's levels. Reducing the threats to construct validity associated with adequacy of operational definitions, concepts related to influences on military service physical activity behavior are narrowed to determinants identified in the factors (e.g., intrinsic motivation, social environments) and determinants (e.g., competence, perceived health, colleague influence) of the OEBD scale. Respondents were able to provide measurable responses by identifying a Likert scale with an associated rating scale that measures the opinion, attitude, and behavior identified in the OEBD scale.

Mono-operation bias and mono-method bias were two additional threats to construct validity. Addressing mono-operation bias enables the multi-operationalization of variables related to the independent variables (see Petursdottir & Carr, 2018). As a non-experimental design, mono-operation bias was not a threat. Mono-method bias, however, threatens construct validity when a single method of collecting data is used (see Petursdottir & Carr, 2018). The data obtained was self-reported, with responses from the questionnaire indicating a potential level of bias. The questionnaire included the OEBD and IPAQ to help reduce bias by identifying physical activity behaviors and the factors and determinants measured in the OEBD scale.

Questionnaire responses included categorical and continuous variables to reduce the threat to construct validity associated with the measurement levels. The OEBD scale used ordinal variables, continuous responses for the IPAQ, and nominal and dichotomous variables for demographic questions. Using continuous variables when appropriate allowed the findings to reflect the associated behavior identified in the responses to office-related exercise determinants.

The final threat to validity was construct confounding. Petursdottir and Carr (2018) state that confounding constructs result from not recognizing how outcomes can be based on the identified levels of the variables. There must be recognition that specific individual military characteristics (e.g., military occupations, deployments, rank) affect physical activity behavior. Through the identification of the threats to construct validity, the potential for flawed conclusions, and the identification of the office-related determinants within the military community, based on the sampled population.

Ethical Procedures

The research adhered to all applicable ethical procedures and best practices regarding the military and veteran population to minimize any potential red flag issues. As Gordon (2020) stated, service members are considered vulnerable due to the institutional nature of the military and the inability to decline research participation. One red flag issue was the research affiliation with the intended population. Acknowledging the affiliation between the military Morale, Welfare and Recreation program and the researcher was required. As a federal government employee for Commander, Navy Installation Command, the legal department cited Office of Government Ethics regulation, 5 C.F.R. § 2635.702. Ethics regulations restrict one's position, authority, and access for private gain, preventing the researcher from collecting data within the workplace (U.S. Department of Justice, 2023). The research aimed to identify work-related determinants of physical activity; however, it did not receive endorsement or support from the U.S. Department of War or its associated departments (e.g., Navy, Air Force, Army). Non-support and endorsement from the U.S. Department of War or its military branches removed the requirement for military permissions or Institutional Review Board approval. Only the Walden University Institutional Review Board (IRB) was required for this research. A partnership with Stars and Stripes of Defense Media Activity was established to conduct the research and reach the intended population.

Confidentiality and informed consent were ethical concerns in the partnership with Stars and Stripes and the researcher. Confidentiality and informed consent were maintained to reduce ethical issues arising from service member participation in the

research. The survey was anonymous, preventing tracing responses to the respondent to ensure the confidentiality of participants. The OEBD scale, IPAQ, and demographic characteristics did not include personally identifiable information, further protecting the anonymity of the research participants. Before participation, research participants completed the consent form approved by the Walden University Institutional Review Board. The consent form included details regarding the nature of the study, the risks and benefits of participating in the study, privacy, and contact information. Participants could not complete the survey without completing the consent form.

Summary

Chapter 3 described the research methodology used to identify determinants of physical activity. This chapter also discussed the administration of the questionnaire, study design and approach, population and sample size, intended instrumentation, data collection, data handling, and data analysis.

Chapter 4: Results

The purpose of this study was to examine the work-related exercise behavior of the U.S. military, military retirees, and military veterans to gain a better understanding of the determinants that may impact physical readiness and the increasing prevalence of overweight or obese service members. Despite military policy requiring physical activity and minimum body composition standards and recognized benefits of physical activity, there has been an increased prevalence of service members who are overweight or obese. Reports have indicated that obesity in the U.S. Department of War has fluctuated from 17.9% in 2019 to 23% in 2023 (Defense Health Agency Public Health, 2025; U.S. Department of Defense, 2019). The increasing rates of service members who are overweight or obese hamper military readiness, increasing medical costs due to sedentary behavior within the military community. Identifying the work-related determinants of exercise within current and former service members is essential in developing appropriate and effective interventions and improving military policy.

This study sought to answer the following five research questions:

RQ1: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency?

H_{01}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency.

RQ2: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI?

H_{02}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI.

RQ3: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI?

H_{03}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI.

RQ4: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI?

H_{04}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and social environment factors on BMI.

RQ5: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI?

H_{05}: There is no statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and work environment factors on BMI.

This chapter presents the findings from the survey results from current and former U.S. service members. Participants were drawn from a partnership with Stars and Stripes, an independent media outlet focused on the military community. Individuals' email addresses on file with the Stars and Stripes newsletter received an email requesting completion of a voluntary survey directly from the media source. Additionally, the Walden University Participant Pool promoted the request for survey participation. Chapter 4 concludes by explaining the procedures for data collection and analysis, the time frame used for data collection, recruitment strategy, and results of statistical tests performed to answer the proposed research questions and test the hypothesis for each research question.

Data Collection

To explain the findings related to the research questions, it is essential to describe data treatment, including approval and participant consent, population and sample size, data transfer, and data cleaning and organizing.

Approval and Consent

To access a population segment needed to conduct the study, an email endorsement was obtained from Stars and Stripes, Director of Engagement, Mr. Chris Verigan (Appendix A), and the Walden University Participant Pool (Appendix B). The Institutional Review Board (IRB) application was submitted and approved by Walden

University (Appendix C). Endorsement by email to use the OEBD scale (Appendix D) was obtained prior to initiating the study. The IPAQ (Appendix E) was determined to be an open-source survey; no written endorsement was needed. Consent was received from participants using the standardized Walden University Anonymous Survey Consent Form, which was included at the start of the OEBD and IPAQ surveys, titled Determinants of Military-related Office Physical Activity Behavior (Appendix F).

Instrumentation

The online survey on SurveyMonkey comprised 20 multiple-choice and open-ended questions. Questions included age, gender, race/ethnicity, military branch, rank, occupation, and status (e.g., Active duty, Retired, Veteran), educational level, relationship status, physical activity behavior using the IPAQ, and OEBD scale.

Population and Sample Size

Participants were recruited through the Walden University Participant Pool and Stars and Stripes. All survey responses were collected between October 2024 and February 2025, with Walden University Participant Pool promoting the online survey from October 07, 2024, until December 16, 2024. The survey promotion with the Stars and Stripes occurred on October 10, 2024, through a direct email from the Stars and Stripes Engagement Team. After over 90 days, the study was closed online, with a total of 986 respondents. The minimum sample size of 103 respondents was achieved for statistical power using multiple linear regression.

Data Transfer

Data was transferred from the online survey directly into IBM SPSS Statistics 30.0.

Data Cleaning and Organizing

Data was scrubbed of all personal information except participants' age, gender, weight, height, and race/ethnicity. The data was organized based on military branch, occupation, rank, and current military status (e.g., active, retired, veteran). The inclusion of participant survey responses was based on the indication of the participant's current or former military affiliation, responses to the Office Exercise Behavior Scale, and inaccurate height or weight responses. The final number of 757 survey responses included in the study from the original 986 responses is due to 34 cases not being current or former service members or missing values.

Responses to body weight were requested in pounds and height in inches. Both bariatric measurements (i.e., weight, height) were converted to kilograms and meters squared to calculate BMI. Responses to the OEBD scale were categorized into four factors: intrinsic motivation, extrinsic motivation, social environment, and work environment. All questions were numbered individually for statistical analysis using IBM SPSS v30. Survey respondents who did not provide a response to their military status but identified their military affiliation (32), military branch (1), military rank (5), military occupation (8), were re-coded to prefer not to respond. Five blank responses for gender and three for race/ethnicity were re-coded to prefer not to respond.

Data Analysis

Demographic Results

Gender

As shown in Table 1 and Figure 1, of the 757 survey respondents, 684 identified themselves as male, 65 as female, two as other, and six preferred not to respond.

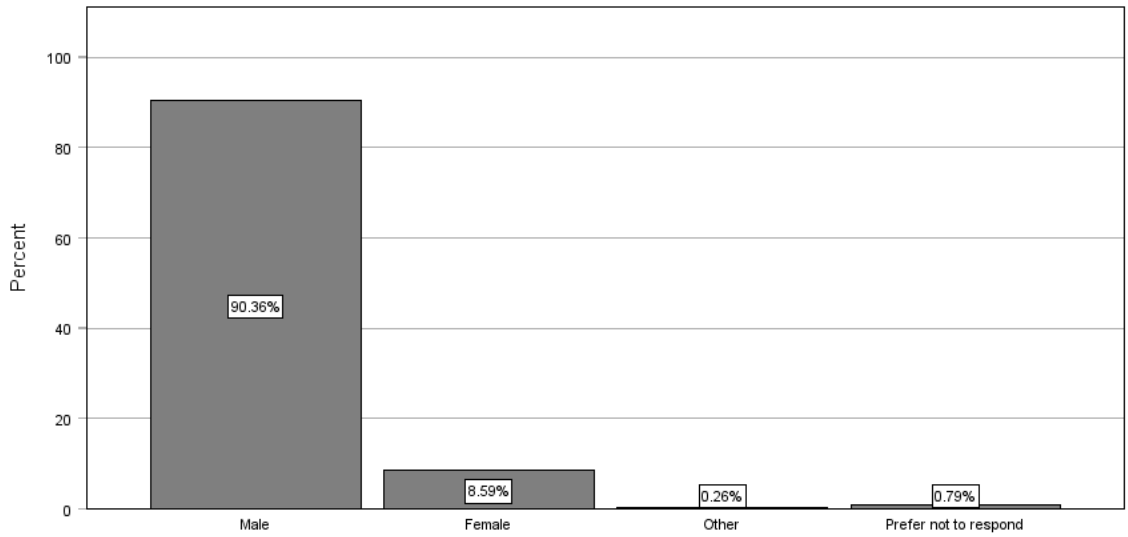
Table 1

Gender

Category	Frequency (N = 757)	Percentage	Valid percentage	Cumulative percentage
Male	684	90.4	90.4	90.4
Female	65	8.6	8.6	98.9
Other	2	.3	.3	99.2
Prefer not to respond	6	.8	.8	100
Total	757	100	100	

Figure 2

Gender of Survey Respondents



Race/Ethnicity

The race/ethnicity of the 757 respondents is shown in Table 2 and Figure 2. Of the respondents, the largest three ethnic groups were 637 identifying as White (84.1%), 40 as Black or African American (5.3%), and 24 as Multi-racial (3.2%).

Table 2

Race/Ethnicity

Category	Frequency (N = 757)	Percentage	Valid percentage	Cumulative percentage
American Indian or Alaska Native	11	1.5	1.5	1.5
Asian	14	1.8	1.8	3.3
Black or African American	40	5.3	5.3	8.6
Native Hawaiian or Other Pacific Islander	8	1.1	1.1	9.6
White	637	84.1	84.1	93.8
Multi-racial	24	3.2	3.2	97
Unknown	2	.3	.3	97.2
Prefer not to respond	21	2.8	2.8	100
Total	757	100	100	

Military Affiliation and Branch

Of the 757 survey respondents, 51.3% identified as a Retiree (n = 388), 44% Veteran (n = 333), 3.7% Active Duty (n =28), and 1.1% Reservist (n = 8). The percentage of respondents from the military branches and affiliations is shown in Table 3, Table 4, and Figure 2.

Table 3

Current Military Affiliation

Category	Frequency (N = 757)	Percentage	Valid percentage	Cumulative percentage
Active Duty	28	3.7	3.7	3.7
Reservist	8	1.1	1.1	4.8
Military Retiree	388	51.3	51.3	56
Military Veteran	333	44	44	100
Total	757	100	100	

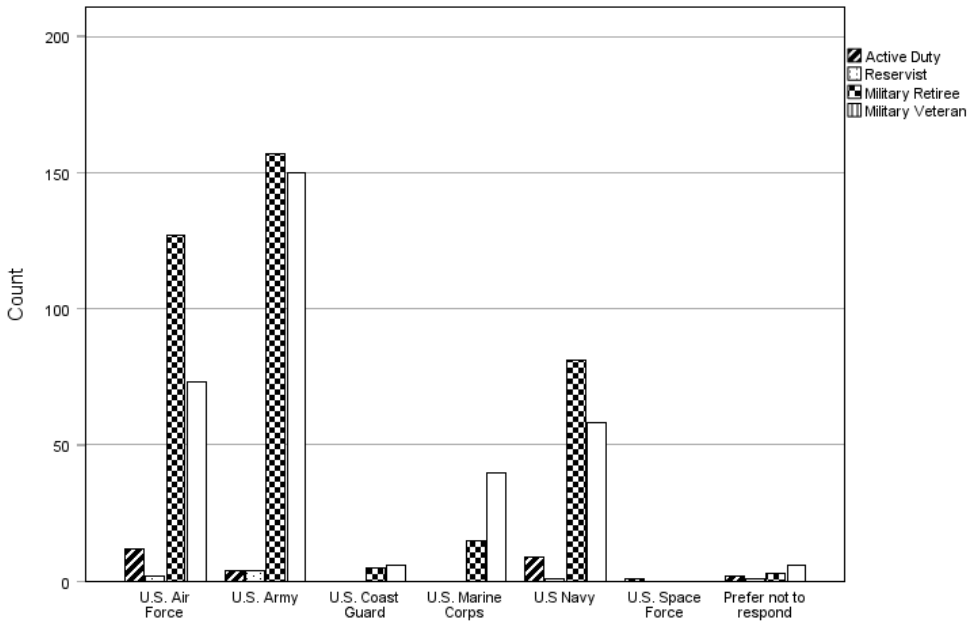
Table 4

U.S. Military Branch

Category	Frequency (N = 757)	Percentage	Valid percentage	Cumulative percentage
Air Force	214	28.3	28.3	28.3
Army	315	41.6	41.6	69.9
Coast Guard	11	1.5	1.5	71.3
Marine Corps	55	7.3	7.3	78.6
Navy	149	19.7	19.7	98.3
Space Force	1	.1	.1	98.4
Prefer not to respond	12	1.6	1.6	100
Total	757	100	100	

Figure 3

U.S. Military Branch and Affiliation of Survey Respondents



Military Rank

As shown in Table 5, the military ranks of the 757 survey respondents are identified. Of the survey respondents, 60.2% identified as enlisted (*n* = 456), 2.2% were Warrant Officers (*n* = 17), 36.5% identified as Officer (*n* = 36.5%), and 1.1% did not identify their military rank (*n* = 8). The respondents' rank category is reflected in Figure 4.

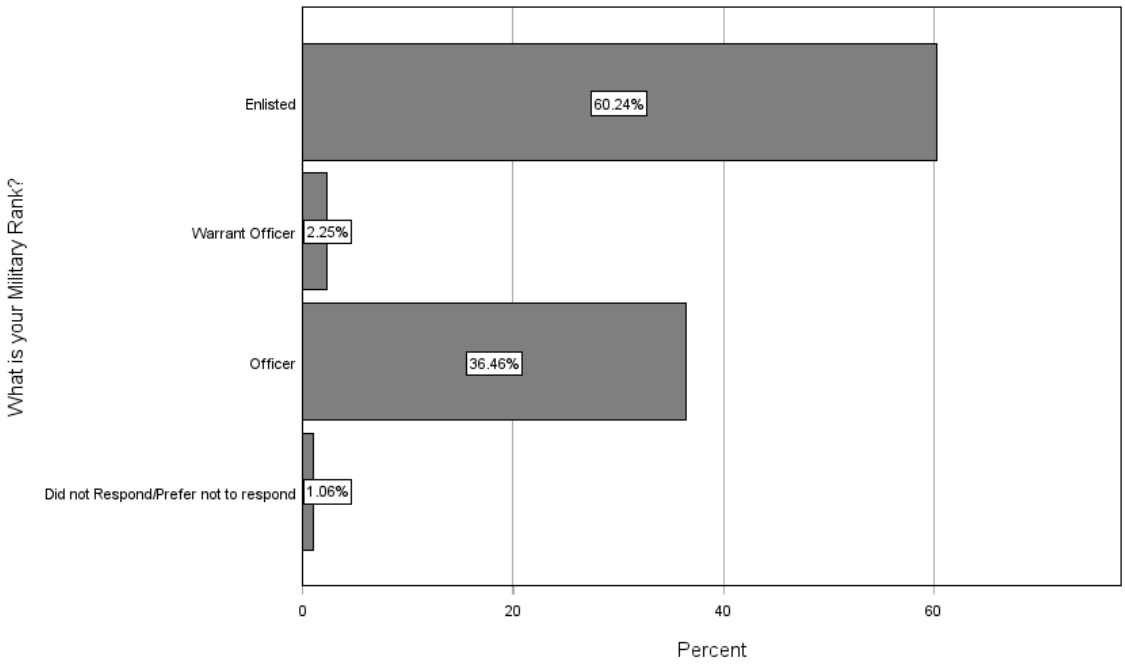
Table 5

Military Rank

Category	Frequency ($N = 757$)	Percentage	Valid percentage	Cumulative percentage
E-1	3	.4	.4	.4
E-3	20	2.6	2.6	3.0
E-4	107	14.1	14.1	17.2
E-5	96	12.7	12.7	29.9
E-6	70	9.2	9.2	39.1
E-7	72	9.5	9.5	48.6
E-8	57	7.5	7.5	56.1
E-9	31	4.1	4.1	60.2
W-2	1	.1	.1	60.4
W-3	6	.8	.8	61.2
W-4	10	1.3	1.3	62.5
O-2	7	.9	.9	63.4
O-3	52	6.9	6.9	70.3
O-4	49	6.5	6.5	76.8
O-5	87	11.5	11.5	88.2
O-6	70	9.2	9.2	97.5
O-7	4	.5	.5	98
O-8	6	.8	.8	98.8
O-9	1	.1	.1	98.9
Prefer not to respond	8	1.1	1.1	100
Total	757	100	100	

Figure 4

Military Rank Category of Survey Respondents



Military Occupation

Of the 757 survey responses, the highest identified military occupation percentages were 19.3% Combat (*n* = 146), 13.5% Electronic or electronical equipment operator (*n* = 102), 13.6% Other (*n* = 103), and 11% Administrative (*n* = 83). All survey responses to military occupations are identified in Table 6.

Table 6

Military Occupational Specialty

Category	Frequency ($N = 757$)	Percentage	Valid percentage	Cumulative percentage
Administrative	83	11	11	11
Combat	146	19.3	19.3	30.3
Construction	11	1.5	1.5	31.7
Electronic or electronical equipment operator	102	13.5	13.5	45.2
Engineering, science, and technical	67	8.9	8.9	54
Health care	52	6.9	6.9	60.9
Human resources	19	2.5	2.5	63.4
Machine operator and repair	12	1.6	1.6	65
Media and Public Affairs	6	.8	.8	65.8
Protective Services	39	5.2	5.2	70.9
Support services	10	1.3	1.3	72.3
Transportation and material handlers	47	6.2	6.2	78.5
Vehicle and other mechanics	39	5.2	5.2	83.6
Unusual careers	8	1.1	1.1	84.7
Other	103	13.6	13.6	98.3
Prefer not to respond	13	1.7	1.7	100
Total	757	100	100	

Body Composition Results

Height

The height range of the 757 survey respondents is reflected in Table 7. Of survey responses, 397 respondents are between 70 and 79 inches in height (52.4%), and 320 are between 60 and 69 inches (42.3%).

Table 7

Height (Inches)

Category	Frequency ($N = 757$)	Percentage	Valid percentage	Cumulative percentage
Below 49	13	1.7	1.7	1.7
50 to 59	23	3	3	4.8
60 to 69	320	42.3	42.3	47
70 to 79	397	52.4	52.4	99.5
Above 80	4	.5	.5	100
Total	757	100	100	

Weight

Table 8 includes the weight ranges in pounds for the 757 survey respondents. The three most common weight ranges are 176 to 200 pounds (29.2%), 151 to 175 pounds (22.9%), and 201 to 225 pounds (18.8%).

Table 8

Weight (Pounds)

Category	Frequency (N = 757)	Percentage	Valid percentage	Cumulative percentage
Below 100	2	.3	.3	.3
101 to 125	11	1.5	1.5	1.7
126 to 150	56	7.4	7.4	9.1
151 to 175	173	22.9	22.9	32
176 to 200	221	29.2	29.2	61.2
201 to 225	142	18.8	18.8	79.9
226 to 250	89	11.8	11.8	91.7
251 to 275	34	4.5	4.5	96.2
276 to 300	17	2.2	2.2	98.4
300 and above	12	1.6	1.6	100
Total	757	100	100	

Body Mass Index

As shown in Table 9 and Figure 4, of the 752 survey respondents provided height and weight data grouped using the BMI ranges from the Centers for Disease Control and Prevention (https://www.cdc.gov/bmi/adult-calculator/bmi-categories.html). The BMI category classification of 0.4% respondents self-reported as underweight (N = 3), 23.1% classified as having a healthy weight (n = 174), 42.7% overweight (n = 321), and 33.7% self-reported being classified as having obesity (n = 254).

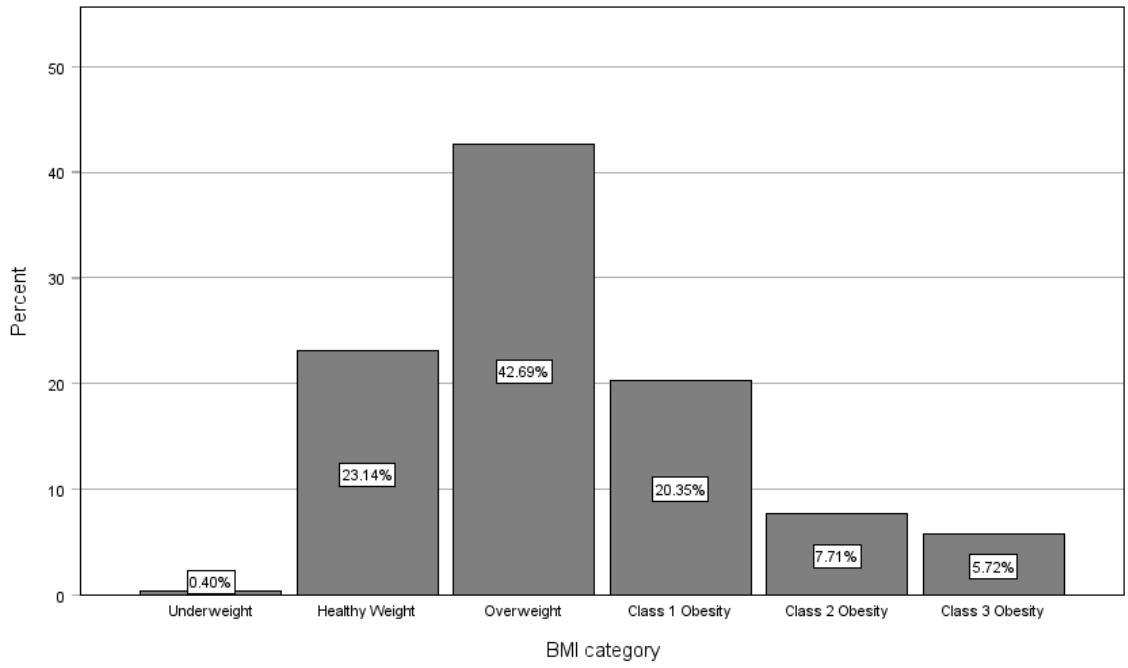
Table 9

Body Mass Index Category

Category	Frequency ($N = 752$)	Percentage	Valid percentage	Cumulative percentage
Underweight	3	.4	.4	.4
Healthy weight	174	23.0	23.1	23.5
Overweight	321	42.4	42.7	66.2
Class 1 obesity	153	20.2	20.3	86.6
Class 2 obesity	58	7.7	7.7	94.3
Class 3 obesity	43	5.7	5.7	100
Total	752	99.3	100	
Missing	5	.7		
Total	757	100		

Figure 5

BMI classification of Survey Respondents



Results

All statistical analysis was conducted using SPSS v30 with confidence intervals set at 95% for all analyses. Independent samples t-test, a multinomial logistic regression, and multiple linear regression to determine statistical significance.

Physical Activity Participation

The frequency of moderate physical activity, vigorous physical activity, and walking conducted during the last seven days provided preliminary insight into the statistical differences between current and former service members, gender, rank, and occupation. The independent samples t-test indicates the differences between the specified groups.

Military Affiliation

The results comparing service members currently serving in the military (i.e., active duty, reservists) and former service members (i.e., retirees, veterans**)** on participation in physical activity frequency and duration is shown in Table 10. An independent-samples t-test was run to determine if there were differences in frequency in physical activity type (i.e., vigorous, moderate, walking) and duration within a seven-day period. The independent samples *t*-test showed no statistical significance.

Table 10

Military Affiliation Differences in Physical Activity

	Active duty[a]		Veteran[b]		*t*(755*)*	*p*	Cohen's *d*
Variable	*M*	*SD*	*M*	*SD*			
Vigorous physical activity in the last seven (7) days	2.92	1.933	2.44	2.215	1.260	.208	.215
Minutes spent doing vigorous activity on one of the days	30.47	23.699	34.81	23.699	-.979	.166	-.082
Moderate physical activity in the last seven (7) days	2.94	2.229	3.14	2.339	-.480	.631	-.082
Minutes spent doing Moderate activity on one of the days	34.42	36.055	44.73	74.014	-.830	.407	-.142
Number of days walking in the last seven (7) days for at least 10 minutes	5.19	1.997	4.70	2.462	1.439	.158	.203
Minutes spent walking on one of the days	53.33	58.700	42.04	66.456	1.00	.318	.171

Note. N = 757. *M* = Mean; *SD* = standard deviation
[a]n = 36. [b]n = 721

Gender Differences

The comparison of gender (i.e., male, female) on participation in physical activity frequency and duration are shown in Table 11. To determine if there was a statistically

significant difference in frequency in physical activity type (i.e., vigorous, moderate, walking) and duration within a seven-day period, an independent-samples t-test was conducted. Minutes spent conducting vigorous physical activity was more in males (M = 35.70, SD = 54.527) than females (M = 24.69, SD = 29.30), a statistically significant difference, M = 11.01, 95% CI [-2.46, 24.47], $t(747) = -.054$, $p = .010$. Male respondents reported a longer duration of vigorous, moderate, and walking duration during one of the days compared to females. Statistically significant differences, M = 16.50, 95% CI [5.03, 5.55], $t(747) = .175$, $p = .001$, was observed between males (M = 45.89, SD = 75.52) and females (M = 29.38, SD = 33.23) reporting the duration of performed moderate physical activity on one day during a seven-day period. The independent samples t-test showed no statistical significance between genders on the number of days military members reported conducting vigorous physical activity, moderate physical activity, and walking more than 10 minutes during the seven-day period. Additionally, there was no statistical significance in the minutes spent walking between male and female military members.

Table 11

Gender Differences in Physical Activity

Variable	Male[a]		Female[b]		*t*(747)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Vigorous physical activity in the last seven (7) days	2.49	2.230	2.11	1.838	1.582	.118	.175
Minutes spent doing vigorous activity on one of the days	35.70	54.527	24.69	29.300	2.627	.010	.208
Moderate physical activity in the last seven (7) days	3.14	2.335	3.15	2.340	-.054	.957	-.007
Minutes spent doing moderate activity on one of the days	45.89	75.517	29.38	33.231	1.745	.001	.226
Number of days walking in the last seven (7) days for at least 10 minutes	4.72	2.429	4.60	2.639	.385	.701	.050
Minutes spent walking on one of the days	43.34	68.102	34.77	43.602	.995	.320	.129

Note. N = 749. *M* = Mean; *SD* = standard deviation
[a]n = 684. [b]n = 65

Rank Differences

The results comparing physical activity frequency and duration of current and previous enlisted and officer military members are shown in Table 12. To determine if there was a statistically significant difference in frequency of physical activity type (i.e., vigorous, moderate, walking) and duration within a seven-day period, an independent samples t-test was conducted. Minutes spent conducting moderate physical activity were more in enlisted military members ($M = 48.25$, $SD = 83.48$) than officers ($M = 36.82$, $SD = 51.12$), a statistically significant difference, $M = 11.43$, 95% CI [1.66, 21.20], $t(732) = 2.30$, $p = .022$. The independent samples t-test showed no statistical significance between

enlisted and officers for the frequency and duration of vigorous physical activity, the frequency of moderate physical activity, and the frequency and duration of walking.

Table 12

Rank Differences in Physical Activity

	Enlisted[a]		Officer[b]		*t*(732)	*p*	Cohen's *d*
Variable	*M*	*SD*	*M*	*SD*			
Vigorous physical activity in the last seven (7) days	2.37	2.165	2.64	2.285	-1.571	.117	-.120
Minutes spent doing vigorous activity on one of the days	34.33	52.034	34.74	52.980	-.102	.919	-.008
Moderate physical activity in the last seven (7) days	3.16	2.341	3.05	2.367	.585	.558	.045
Minutes spent doing Moderate activity on one of the days	48.25	83.467	36.82	51.124	2.297	.022	.157
Number of days walking in the last seven (7) days for at least 10 minutes	4.57	2.465	4.92	2.417	-1.845	.066	-.141
Minutes spent walking on one of the days	41.61	60.808	45.59	76.249	.683	.436	-.059

Note. *N* = 732. *M* = Mean; *SD* = standard deviation
[a]n = 456. [b]n = 276

Occupation

The results comparing physical activity frequency and duration of service members in labor and non-labor occupations is shown in Table 13. To determine if there was a statistically significant difference in frequency of physical activity type (i.e., vigorous, moderate, walking) and duration within a seven-day period, an independent samples t-test was conducted. Minutes spent walking were higher in non-labor service members (*M* = 48.07, *SD* = 82.88) than labor occupations (*M* = 37.83, *SD* = 41.12), a statistically significant difference, *M*= 10.23, 95% CI [20.60, .13], *t*(560) = 1.94, *p* = .026. The independent samples t-test showed no statistical significance between the two

occupational jobs for the frequency and duration of vigorous physical activity, moderate physical activity, and the frequency of walking.

Table 13

Occupation Difference in Physical Activity

Variable	Labor[a]		Non-Labor[b]		*t*(560)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Vigorous physical activity in the last seven (7) days	2.61	2.213	2.37	2.173	-1.227	.220	-.106
Minutes spent doing vigorous activity on one of the days	38.57	56.590	34.78	54.840	-.782	.435	-.068
Moderate physical activity in the last seven (7) days	3.13	2.345	3.24	2.266	.556	.578	.048
Minutes spent doing Moderate activity on one of the days	48.93	88.818	44.51	59.354	.409	.517	-.056
Number of days walking in the last seven (7) days for at least 10 minutes	4.83	2.356	4.62	2.423	.999	.318	.087
Minutes spent walking on one of the days	37.83	41.121	48.07	82.876	-1.939	.026	-.147

Note. $N = 560$. *M* = Mean; *SD* = standard deviation
[a]n = 342. [b]n = 218

Research Question 1

RQ1: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency? To investigate if there is a relationship between the frequency of physical activity and the predictor variables, military branch, rank, occupation, military affiliation, gender, and race/ethnicity, a multinomial logistic regression was conducted. Frequency of physical activity was obtained through the IPAQ for the duration of physical activity (vigorous or moderate) performed within the last seven days. A multinomial logistic regression model was used to predict the independent

variables of military branch, rank, occupation, status, gender, and race on the frequency of physical activity. Due to data sparsity, military occupations were combined into jobs that could be categorized into three categories: labor, non-labor, and others. Labor occupational groups included Combat, Construction, Electronic or electronical equipment operator, Machine operator and repair, Machine operator and repair, Protective Services, Transportation and material handlers, and Vehicle and other mechanics. Grouped non-labor occupations were Administrative, Engineering, Science, and Technical, Health Care, Support Services, Human Resources, Media and Public Affairs, and Unusual careers. Ethnicity was re-coded into a binary variable (i.e., White, Other) due to low response in all races/ethnicities other than those that identified as White. Additionally, responses to military branches were re-grouped, combining U.S. Coast Guard, U.S. Space Force, and responses of those that did not wish to respond, due to a lack of survey responses. Table 14 represents the case summary for the independent and dependent variables for hypothesis testing, with the proportion of valid responses for each category listed under the marginal percentage.

Table 14

Case Processing Summary

	Category	*n*	Marginal percentage
Frequency of physical activity?	No physical activity	64	11.6%
	Less than 30 minutes	60	10.9%
	30 - 59 minutes	103	18.7%
	60 - 89 minutes	108	19.6%
	90 - 149 minutes	129	23.4%
	150 minutes or more	87	15.8%
U.S. Military Branch	Air Force	167	30.3%
	Army	225	40.8%
	Marine	36	6.5%
	Navy	106	19.2%
	Other (Coast Guard, Space Force, Prefer Not to Say)	17	3.1%
Military Occupation	Non-Labor	191	34.7%
	Labor	288	52.3%
	Other	72	13.1%
Valid		551	100%
Total		551	

Model fitting is located in Table 15. The full model was statistically significant, indicating that it was able to distinguish effectively between physical activity duration and the predictor variables, x2(50) = 74.941, p=.013.

Table 15

Model Fitting Information

Model	Model fitting criteria			Likelihood ratio test		
	AIC	BIC	-2 log likelihood	Chi-square	*df*	Sig.
Intercept only	710.755	732.314	700.755			
Final	735.814	972.959	625.814	74.941	50	.013

However, Pearson's chi-square test [$x2(370) = 425.69$, p=.02] indicated the model was not a good fit, while the Deviance chi-square [$x2(370) = 324.90$, p=.96] suggests that the model fits the data as found in Table 16.

Table 16

Goodness-of-Fit

Category	Chi-square	*df*	Sig.
Pearson	425.690	370	.024
Deviance	324.902	370	.956

The parameter estimates in Table 17 compare the frequency of physical activity of current and former service members. For a duration of physical activity of 30 minutes or less, compared to those who did not indicate performing physical activity, military occupation was statistically significant. For frequency of physical activity compared to reporting no physical activity, race/ethnicity, and a non-labor occupation were significant predictors. Race/Ethnicity was associated with performing physical activity (B = 1.43, p = .04, 95% CI [.1.5, 16.74]). Service members in a non-labor occupation were associated with performing less than 30 minutes of physical activity (B = 1.367, p = .02, 95% *CI* [.1,

12.24]). Non-labor occupations (*B* = 1.31, *p* = .01, 95% CI [1.39, 9.94]) and labor occupations (*B* = 1.05, *p* = .03, 95% CI [1.14, 7.22]) were also associated with performing 30 to 59 minutes of physical activity compared to not being physically active. When comparing the reported frequency of 60 to 89 minutes to not reporting physical activity, military rank (*B* = 1.05, *p* < .000, 95% CI [1.43, 5.7]) and race/ethnicity (*B* = 1.73, *p* = .01, 95% CI [1.55, 20.62]) were significant predictors. For service members reporting 90 to 149 minutes of physical activity compared to no physical activity, labor occupations (*B* = 1.07, *p*=.01, 95% CI [1.27, 6.72]) were determined to be a significant predictor. Both labor (*B* = 1.60, *p* <.000, 95% CI [1.62, 15.26]) and non-labor occupations (*B* = 1.53, *p* <.*000*, 95% CI [1.62, 13.23]) were statistical predictors for service members performing more than 150 minutes of physical activity compared to service members not reporting physical activity.

Table 17

Parameter Estimates

Frequency of moderate or vigorous physical activity? [a]		*B*	Std. Error	Wald	*df*	Sig.	Odds ratio	95% confidence interval for Exp(B)	
								Lower bound	Upper bound
Less than 30 minutes	Intercept	-2.946	1.798	2.684	1	0.101	-	-	-
	Gender	-0.401	0.728	0.302	1	0.582	0.670	0.161	2.792
	Military Rank	0.249	0.401	0.384	1	0.535	1.282	0.584	2.813
	Military Status	1.161	1.274	0.831	1	0.362	3.193	0.263	38.743
	Race/Ethnicity	1.432	0.707	4.100	1	0.043	4.186	1.047	16.737
	Branch - Air Force	0.396	1.288	0.095	1	0.758	1.486	0.119	18.563
	Branch - Army	0.994	1.298	0.587	1	0.444	2.702	0.212	34.374
	Branch - Marine	0.382	1.475	0.067	1	0.796	1.465	0.081	26.391
	Branch - Navy	0.382	1.331	0.082	1	0.774	1.465	0.108	19.909
	Branch - Other	0[b]	-	-	0	-	-		-

Frequency of moderate or vigorous physical activity? [a]		*B*	Std. Error	Wald	*df*	Sig.	Odds ratio	95% confidence interval for Exp(B)	
								Lower bound	Upper bound
	Occupation - Non-labor	1.367	0.581	5.542	1	0.019	3.922	1.257	12.238
	Occupation - Labor	1.066	0.549	3.776	1	0.052	2.904	0.991	8.510
	Occupation - Other	0[b]	-	-	0	-	-	-	-
30 - 59 minutes	Intercept	-0.761	1.318	0.334	1	0.564	-	-	-
	Gender	0.542	0.580	0.872	1	0.350	1.719	0.551	5.362
	Military Rank	0.544	0.355	2.351	1	0.125	1.723	0.859	3.456
	Military Status	-0.466	0.855	0.296	1	0.586	0.628	0.117	3.356
	Race/Ethnicity	0.890	0.689	1.669	1	0.196	2.435	0.631	9.398
	Branch - Air Force	-0.058	1.060	0.003	1	0.956	0.943	0.118	7.537
	Branch - Army	0.846	1.072	0.623	1	0.430	2.330	0.285	19.045
	Branch - Marine	0.651	1.211	0.289	1	0.591	1.917	0.179	20.571
	Branch - Navy	0.419	1.089	0.148	1	0.701	1.520	0.180	12.848
	Branch - Other	0[b]	-	-	0	-	-	-	-
	Occupation - Non-labor	1.312	0.502	6.815	1	0.009	3.712	1.387	9.938
	Occupation - Labor	1.052	0.472	4.977	1	0.026	2.865	1.136	7.221
	Occupation - Other	0[b]	-	-	0	-	-	-	-
60 - 89 minutes	Intercept	-0.515	1.249	0.170	1	0.680	-	-	-
	Gender	0.239	0.610	0.153	1	0.696	1.270	0.384	4.199
	Military Rank	1.049	0.352	8.903	1	0.003	2.856	1.433	5.690
	Military Status	-0.352	0.849	0.172	1	0.678	0.703	0.133	3.710
	Race/Ethnicity	1.733	0.660	6.898	1	0.009	5.655	1.552	20.606
	Branch - Air Force	-0.061	0.985	0.004	1	0.950	0.940	0.136	6.485
	Branch - Army	0.493	1.002	0.242	1	0.623	1.637	0.230	11.673
	Branch - Marine	0.096	1.173	0.007	1	0.935	1.100	0.110	10.973
	Branch - Navy	0.321	1.016	0.100	1	0.752	1.379	0.188	10.110
	Branch - Other	0[b]	-	-	0	-	-	-	-
	Occupation - Non-labor	0.534	0.473	1.274	1	0.259	1.706	0.675	4.315
	Occupation - Labor	0.751	0.428	3.083	1	0.079	2.120	0.916	4.906
	Occupation - Other	0[b]	-	-	0	-	-	-	-
90 - 149 minutes	Intercept	0.585	1.156	0.256	1	0.613	-	-	-
	Gender	0.131	0.593	0.049	1	0.825	1.140	0.357	3.641
	Military Rank	0.226	0.346	0.428	1	0.513	1.254	0.637	2.469
	Military Status	-0.290	0.846	0.118	1	0.731	0.748	0.142	3.927

Frequency of moderate or vigorous physical activity? [a]		*B*	Std. Error	Wald	*df*	Sig.	Odds ratio	95% confidence interval for Exp(B)	
								Lower bound	Upper bound
	Race/Ethnicity	0.778	0.675	1.328	1	0.249	2.178	0.580	8.181
	Branch - Air Force	-1.099	0.865	1.614	1	0.204	0.333	0.061	1.816
	Branch - Army	-0.120	0.880	0.018	1	0.892	0.887	0.158	4.983
	Branch - Marine	-0.467	1.030	0.205	1	0.651	0.627	0.083	4.724
	Branch - Navy	-0.552	0.897	0.378	1	0.539	0.576	0.099	3.344
	Branch - Other	0[b]	-	-	0	-	-	-	-
	Occupation - Non-labor	0.915	0.469	3.812	1	0.051	2.498	0.996	6.261
	Occupation - Labor	1.072	0.425	6.350	1	0.012	2.920	1.269	6.720
	Occupation - Other	0[b]	-	-	0	-	-	-	-
150 minutes or more	Intercept	-1.915	1.481	1.671	1	0.196	-	-	-
	Gender	-0.647	0.724	0.798	1	0.372	0.524	0.127	2.165
	Military Rank	-0.045	0.379	0.014	1	0.905	0.956	0.454	2.010
	Military Status	0.607	1.045	0.337	1	0.561	1.835	0.237	14.234
	Race/Ethnicity	1.140	0.691	2.722	1	0.099	3.127	0.807	12.119
	Branch - Air Force	-0.254	1.073	0.056	1	0.813	0.776	0.095	6.357
	Branch - Army	0.753	1.081	0.486	1	0.486	2.124	0.255	17.653
	Branch - Marine	0.581	1.210	0.230	1	0.631	1.787	0.167	19.137
	Branch - Navy	0.271	1.103	0.060	1	0.806	1.312	0.151	11.405
	Branch - Other	0[b]	-	-	0	-	-	-	-
	Occupation - Non-labor	1.603	0.573	7.826	1	0.005	4.966	1.616	15.262
	Occupation - Labor	1.533	0.535	8.194	1	0.004	4.631	1.621	13.227
	Occupation - Other	0[b]	-	-	0	-	-	-	-

a. The reference category is: No physical activity.

b. This parameter is set to zero because it is redundant.

Office Exercise Behavior Determinants

Respondents to the OEBD scale identified their level of agreement using a 7-point Likert Scale, ranging from strongly disagree (1) to strongly agree (7). From the surveyed population, 663 respondents provided complete responses to all items, with the mean scores for each item in Table 18. Survey respondents indicated higher agreement with

extrinsic motivation factors, with the highest agreement that exercise increases muscle strength (*M* = 5.9) and that performing exercise improves cardiovascular function (*M* = 5.95). Current and former service members also disagree that physical activity is boring (*M* = 2.8) and does not hold their attention (*M* = 2.8). Concerning working environment factors, respondents did not agree or disagree on the influence of work pace (*M* = 3.4), break time (*M* =3.4), policy of the working company (*M* = 3.4), and work burden on their exercise behavior (*M* = 3.7).

Table 18

Office Exercise Determinant Scale Means

Factor	Determinant	Item	*M*	*SD*
Intrinsic Motivation	Competence	I think I am pretty good at physical activities.	4.84	1.646
		I put a lot of effort into physical activity.	4.56	1.726
		I think I do pretty well at physical activity, compared to my peers.	4.97	1.705
		I haven't tried very hard to do well at physical activities.	3.31	1.813
		I try very hard at physical activity.	4.43	1.828
		I am pretty skilled at the level of exercise that I do.	4.99	1.467
		I haven't put much energy into doing physical activity.	3.27	1.846
	Enjoyment	I enjoy participating in exercise very much.	4.83	1.697
		Exercise is fun to do.	4.75	1.696
		I think that physical activity is boring.	2.8	1.547
		Physical activity does not hold my attention at all.	2.79	1.584
		I would describe physical activity as very interesting.	4.54	1.588
		I think that physical activity is quite enjoyable.	4.82	1.604

Factor	Determinant	Item	*M*	*SD*
Extrinsic Motivation	Perceived Health	While participating in physical activity, I think about how much I enjoy it.	4.11	1.645
		Exercise improves my mental health.	5.77	1.214
		Exercise increases my muscle strength.	5.9	1.025
		Exercising will keep me from having high blood pressure.	5.46	1.261
		My muscle tone is improved with exercise.	5.69	1.193
		Exercising improves functioning of my cardiovascular system.	5.95	1.03
		My disposition is improved with exercise.	5.59	1.24
		Exercising helps me sleep better at night.	5.41	1.309
		Exercising improves overall body functioning for me.	5.65	1.184
Social Environment	Family and Friends' Influence	Generally speaking, I want to do what my families and friends think I should do.	3.9	1.513
	Colleague Influence	My colleagues would think that I should do some physical activity.	3.77	1.614
		Generally speaking, I want to do what my colleagues think I should do.	3.06	1.448
	Superior Influence	My superior would think that I should do some physical activity.	3.5	1.583
		Generally speaking, I want to do what my superior think I should do.	3.29	1.53
		I will have to do some physical activity because my superior requires it.	2.64	1.54
Work Environment	Work Pace	The work pace in the command influences my exercise behavior.	3.44	1.686
	Break Time	The break time in the command influences my exercise behavior.	3.37	1.615
	Policy of Working Company	The policy of command/unit influences my exercise behavior.	3.37	1.673
	Work Burden	The work burden in the office influences my exercise behavior.	3.68	1.75

Note. $N = 663$. *M*= Mean; *SD* = standard deviation

Military Affiliation Differences

The results comparing office-related exercise determinants and military members' affiliation are shown in Table 19. To determine if there was a statistically significant difference between the office-related exercise determinant factors and military affiliation, an independent-samples t-test was conducted. Intrinsic motivation was higher in active duty and reservist (M = 4.53, SD = .58) than retiree and veterans (M = 4.20, SD = .71), a statistically significant difference, M = .33, 95% CI [.12, .54], $t(611) = 3.15$, p = .003. External motivation score was higher for service members who are active duty or are a reservist compared to former service members. Statistical significance was observed for external motivation between active duty and reservist (M = 6.03, SD = 1.03) than retiree and veterans (M = 5.66, SD = .97), a statistically significant difference, M = .37, 95% CI [.03, .71], $t(611) = 2.16$, p = .031. Additionally, the work environment was statistically significant, with higher overall work environment score among active duty and reservists (M = 4.25, SD = 1.72) than retirees and veterans (M = 3.42, SD = 1.47), a statistically significant difference, M = .83, 95% CI [.32, 1.35], $t(611) = 3.17$, p = .002. The independent samples t-test showed no statistical significance between the groups concerning the social environment.

Table 19

Military Affiliation Differences in Office Exercise Behavior Scale

Variable	Active duty[a]		Retiree[b]		*t*(661)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Intrinsic motivation	4.53	.583	4.20	.711	3.149	.003	.464
Extrinsic motivation	6.03	1.030	5.66	.971	2.160	.031	.380
Social environment	3.74	1.276	3.34	1.123	1.982	.048	.349
Work environment	4.25	1.742	3.42	1.474	3.169	.002	.558

Note. $N = 629$. *M* = Mean; *SD* = standard deviation
[a]n = 34. [b]n = 629

Gender Differences

The office-related exercise determinants and gender results is shown in Table 20. An independent samples t-test was conducted to determine statistical significance between the office-related exercise determinant factors and gender. The independent samples t-test revealed no statistical significance between the males and females relating to intrinsic motivation, extrinsic motivation, social environment, and work environment scores.

Table 20

Gender Difference in Office Exercise Behavior Determinants

Variable	Male[a]		Female[b]		*t*(654)	*p*	Cohen's *d*
	M	*SD*	*M*	*SD*			
Intrinsic motivation	4.20	.707	4.34	.728	-1.392	.164	-.189
Extrinsic motivation	5.67	.973	5.83	.986	-1.232	.218	-.167
Social environment	3.36	1.123	3.44	1.145	-.471	.638	-.064
Work environment	3.45	1.506	3.75	1.334	-1.666	.100	-.204

Note. *N* = 656. *M* = Mean; *SD* = standard deviation
[a]n = 596. [b]n = 60

Rank Differences

The results comparing office-related exercise determinants and military rank (i.e., enlisted, officer) are shown in Table 21. To determine if there was a statistically significant difference between the office-related exercise determinant factors and rank, an independent samples t-test was conducted. Intrinsic motivation score was lower in enlisted (M = 4.14, *SD* = .74) than officers (M = 4.34, *SD* = .634), a statistically significant difference, M = -.21, 95% CI [.-.32, -.1], t(640) = -3,74, p = <.001. The external motivation score was higher in officers (*M* = 5.87, *SD* = .81) than in enlisted (*M* = 5.56, *SD* = 1.06) service members, a statistically significant difference, *M* = -.30, 95% CI [-.45, -.16], *t*(640) = -4.09, *p* = <.001. Additionally, work environment scores were higher in officers compared to enlisted. Statistical significance among enlisted (*M* = 3.37, *SD* = 1.48) and officers (*M* = 3.63, *SD* = 1.52), a statistically significant difference, *M* = -.26, 95% CI [-.5, -.02], t(640) = -2.15, *p* = .033. The independent samples t-test showed

no statistical significance between the enlisted and officers concerning social environment scores.

Table 21

Rank Differences in Office Exercise Behavior Determinants

	Enlisted[a]		Officer[b]		*t*(640)	*p*	Cohen's *d*
Variable	*M*	*SD*	*M*	*SD*			
Intrinsic motivation	4.14	.744	4.34	.634	-3.743	<.001	-.294
Extrinsic motivation	5.56	1.059	5.87	.807	-4.087	<.001	-.312
Social environment	3.31	1.141	3.44	1.110	-1.483	.139	-.121
Work environment	3.37	1.477	3.63	1.522	.854	.032	-.176

Note. *N* = 642. *M* = Mean; *SD* = standard deviation
[a]n = 404. [b]n = 238

Occupation

The results comparing office-related exercise determinants and occupation (i.e., labor, non-labor) are shown in Table 22. To determine if there was a statistically significant difference between the office-related exercise determinant factors and occupation, an independent samples t-test was conducted. A higher extrinsic motivation score was observed in non-labor occupations when compared to labor occupations in service members. The difference in extrinsic motivation was statistically significant between labor occupations (*M* = 5.62, *SD* = 1.02) and non-labor occupations (*M* = 5.82, *SD* = .88), a statistically significant difference, *M* = .20, 95% CI [.04, .37], t(560) = 2.40, *p* = .017. The independent samples t-test showed no statistical significance between labor and non-labor occupations concerning intrinsic motivation, social environment, and work

environment scores, although labor occupations' mean scores were lower for the three determinant factors.

Table 22

Occupation Differences in Office Exercise Behavior Determinants

	Labor[a]		NonLabor[b]		*t*(560)	*p*	Cohen's *d*
Variable	*M*	*SD*	*M*	*SD*			
Intrinsic motivation	4.18	.732	4.26	.675	1.324	.186	.115
Extrinsic motivation	5.62	1.033	5.82	.877	2.402	.017	.208
Social environment	3.31	1.124	3.45	1.124	1.485	.138	1.124
Work environment	3.44	1.516	3.49	1.516	.399	.690	1.496

Note. $N = 560$. *M* = Mean; *SD* = standard deviation
[a]n = 342. [b]n = 218

Research Question 2

RQ2: Is there a statistically significant relationship in military branch, rank, occupation, affiliation (i.e., active duty/reservist, veteran/retiree), gender, race, and intrinsic motivation factor on BMI? A multiple linear regression was run to predict BMI from military branch, rank, occupation, and current military status (i.e., Active Duty/Reservist, Retiree/Veteran), gender, race, and intrinsic motivation factor score. The multiple regression model statistically significantly predicted BMI, $F(32, 578) = 2.167$, $p = <.001$, adj $R^2 = .058$. Intrinsic motivation, gender, military affiliation, serving as an officer, and identifying as being American Indian or Alaska Native added statistical significance to the prediction, $p < .05$. Regression coefficients and standard errors can be found in Table 23.

Table 23

Multiple Linear Regression Predicting BMI With Intrinsic Motivation

Variable	*B*	*SE*	95% CI	β	*p*
(Constant)	35.597	2.757	(30.182, 41.011)	-	0.000
Intrinsic Motivation	-1.208	0.260	(-1.718, -0.698)	-0.194	0.000
U.S. Army	-0.387	0.451	(-1.272, 0.499)	-0.044	0.391
U.S. Marine	-1.143	0.749	(-2.614, 0.328)	-0.068	0.127
U.S. Navy	-0.632	0.523	(-1.66, 0.396)	-0.057	0.228
Other (Coast Guard, Space Force, Prefer Not to Say)	-0.224	1.100	(-2.383, 1.936)	-0.009	0.839
Enlisted	-3.944	2.155	(-8.177, 0.289)	-0.444	0.068
Warrant Officer	-3.605	2.422	(-8.361, 1.152)	-0.128	0.137
Officer	-4.570	2.170	(-8.831, -0.308)	-0.507	0.036
Gender (Male/Female)	-1.349	0.658	(-2.641, -0.058)	-0.086	0.041
Military Affiliation (Active Duty/Reservist and Retiree/Veteran)	0.337	0.842	(-1.316, 1.99)	0.017	0.689
Occupation - Administrative	1.977	1.711	(-1.383, 5.337)	0.144	0.248
Occupation - Combat	1.970	1.699	(-1.367, 5.307)	0.176	0.247
Occupation - Construction	1.550	2.138	(-2.65, 5.75)	0.045	0.469
Occupation - Electronic or electronical equipment	0.301	1.709	(-3.055, 3.657)	0.024	0.860
Occupation - Engineering, science, and technical	1.474	1.734	(-1.933, 4.88)	0.098	0.396
Occupation - Health care	1.512	1.767	(-1.958, 4.982)	0.091	0.392
Occupation - Human resources	0.523	1.965	(-3.336, 4.381)	0.019	0.790
Occupation - Machine operator and repair	1.506	2.312	(-3.036, 6.047)	0.037	0.515
Occupation - Media and Public Affairs	1.086	2.399	(-3.626, 5.798)	0.025	0.651
Occupation - Protective Services	3.160	1.835	(-0.444, 6.765)	0.152	0.086

Variable	*B*	*SE*	95% CI	β	*p*
Occupation - Support services	1.258	2.312	(-3.283, 5.798)	0.031	0.587
Occupation - Transportation and material handlers	2.803	1.790	(-0.714, 6.319)	0.149	0.118
Occupation - Vehicle and other mechanics	1.813	1.775	(-1.674, 5.3)	0.095	0.308
Occupation - Unusual careers	2.484	2.256	(-1.947, 6.914)	0.065	0.271
Occupation - Other	1.926	1.716	(-1.445, 5.296)	0.151	0.262
Race/Ethnicity - American Indian or Alaska Native	4.278	1.989	(0.372, 8.184)	0.112	0.032
Race/Ethnicity - Asian	-0.152	1.812	(-3.711, 3.407)	-0.005	0.933
Race/Ethnicity - Black or African American	2.243	1.486	(-0.677, 5.163)	0.116	0.132
Race/Ethnicity - Native Hawaiian or Other Pacific Islander	0.799	2.147	(-3.417, 5.015)	0.018	0.710
Race/Ethnicity - White	0.162	1.282	(-2.355, 2.679)	0.013	0.900
Race/Ethnicity - Multi-racial	1.072	1.615	(-2.099, 4.244)	0.043	0.507
Race/Ethnicity - Unknown	5.740	4.520	(-3.137, 14.617)	0.053	0.205

Note. R^2 = .058, $F(32, 578) = 2.167$, p = <.001

Research Question 3

RQ3: Is there a statistically significant relationship in military branch, rank, occupation, affiliation (i.e., active duty/reservist, veteran/retiree), gender, race, and extrinsic motivation factors on BMI? The results from the multiple linear regression to predict BMI score from military branch, rank, occupation, and current affiliation (i.e., active duty/reservist, veteran/retiree), gender, race, and extrinsic motivation factor scores are found in Table 24. The multiple regression model predicted with statistical significance BMI, $F(32, 578) = 1.857$, p = <.003, adj R^2 = .043. Respondent extrinsic

motivation factor score, being an officer, gender, and identifying as American Indian or Alaska Native added statistical significance to the prediction, $p < .05$.

Table 24

Multiple Linear Regression Predicting BMI With Extrinsic Motivation

Variable	*B*	*SE*	95% CI	β	*p*
f(Constant)	33.633	0.000	(28.321, 38.945)	-	0.000
Extrinsic Motivation	-0.661	0.000	(-1.029, -0.293)	-0.147	0.000
U.S. Army	-0.516	0.255	(-1.405, 0.373)	-0.058	0.255
U.S. Marine	-1.191	0.115	(-2.675, 0.292)	-0.071	0.115
U.S. Navy	-0.591	0.262	(-1.627, 0.444)	-0.053	0.262
Other (Coast Guard, Space Force, Prefer Not to Say)	-0.288	0.795	(-2.464, 1.888)	-0.011	0.795
Enlisted	-4.020	0.065	(-8.287, 0.248)	-0.453	0.065
Warrant Officer	-3.625	0.138	(-8.419, 1.169)	-0.129	0.138
Officer	-4.719	0.031	(-9.014, -0.423)	-0.524	0.031
Gender (Male/Female)	-1.488	0.025	(-2.787, -0.189)	-0.095	0.025
Military Affiliation (Active Duty/Reservist and Retiree/Veteran)	0.394	0.643	(-1.273, 2.061)	0.020	0.643
Occupation - Administrative	2.413	0.163	(-0.983, 5.809)	0.176	0.163
Occupation - Combat	2.510	0.145	(-0.865, 5.886)	0.224	0.145
Occupation - Construction	1.923	0.373	(-2.31, 6.157)	0.056	0.373
Occupation - Electronic or electronical equipment	0.832	0.630	(-2.556, 4.219)	0.065	0.630
Occupation - Engineering, science, and technical	2.019	0.251	(-1.429, 5.467)	0.134	0.251
Occupation - Health care	2.158	0.228	(-1.351, 5.668)	0.129	0.228
Occupation - Human resources	1.121	0.572	(-2.776, 5.018)	0.041	0.572
Occupation - Machine operator and repair	1.646	0.480	(-2.932, 6.223)	0.040	0.480
Occupation - Media and Public Affairs	1.670	0.493	(-3.107, 6.448)	0.038	0.493

Variable	*B*	*SE*	95% CI	β	*p*
Occupation - Protective Services	3.458	0.062	(-0.179, 7.095)	0.166	0.062
Occupation - Support services	2.108	0.366	(-2.472, 6.688)	0.051	0.366
Occupation - Transportation and material handlers	3.397	0.061	(-0.153, 6.947)	0.181	0.061
Occupation - Vehicle and other mechanics	2.202	0.219	(-1.315, 5.719)	0.116	0.219
Occupation - Unusual careers	3.561	0.116	(-0.886, 8.007)	0.093	0.116
Occupation - Other	2.320	0.181	(-1.086, 5.726)	0.182	0.181
Race/Ethnicity - American Indian or Alaska Native	4.656	0.021	(0.72, 8.592)	0.121	0.021
Race/Ethnicity - Asian	0.405	0.825	(-3.188, 3.998)	0.012	0.825
Race/Ethnicity - Black or African American	2.235	0.136	(-0.708, 5.177)	0.116	0.136
Race/Ethnicity - Native Hawaiian or Other Pacific Islander	0.645	0.766	(-3.603, 4.893)	0.015	0.766
Race/Ethnicity - White	0.405	0.754	(-2.129, 2.939)	0.033	0.754
Race/Ethnicity - Multi-racial	1.187	0.466	(-2.01, 4.383)	0.047	0.466
Race/Ethnicity - Unknown	5.446	0.232	(-3.5, 14.393)	0.050	0.232

Note. $R^2 = .043$, $F(32, 578) = 1.857$, $p = <.003$

Research Question 4

RQ4: Is there a statistically significant relationship in military branch, rank, occupation, affiliation (i.e., active duty/reservist, veteran/retiree), gender, race, and social environment factors on BMI? A multiple linear regression was run to predict BMI score from military branch, rank, occupation, current military status (i.e., Active Duty/Reservist, Retiree/Veteran), gender, race, and social environment factor score. The multiple regression model failed to predict a statistically significant relationship between BMI and the predictors, nearing statistical significance ($p = .052$). Results from the linear multiple regression can be found in Table 25.

Table 25

Multiple Linear Regression Predicting Body Mass Index With Social Environment

Variable	*B*	*SE*	95% CI	β	*p*
(Constant)	29.387	2.597	(24.286, 34.488)	-	0.000
Social Environment	0.125	0.161	(-0.191, 0.44)	0.032	0.438
U.S. Army	-0.544	0.458	(-1.444, 0.357)	-0.061	0.236
U.S. Marine	-1.399	0.762	(-2.897, 0.098)	-0.083	0.067
U.S. Navy	-0.587	0.533	(-1.634, 0.46)	-0.053	0.271
Other (Coast Guard, Space Force, Prefer Not to Say)	-0.313	1.119	(-2.512, 1.886)	-0.012	0.780
Enlisted	-3.764	2.194	(-8.073, 0.544)	-0.424	0.087
Warrant Officer	-3.571	2.466	(-8.415, 1.273)	-0.127	0.148
Officer	-4.623	2.209	(-8.962, -0.284)	-0.513	0.037
Gender (Male/Female)	-1.569	0.668	(-2.881, -0.258)	-0.100	0.019
Military Affiliation (Active Duty/Reservist and Retiree/Veteran)	0.687	0.855	(-0.992, 2.367)	0.035	0.422
Occupation - Administrative	2.041	1.745	(-1.387, 5.47)	0.149	0.243
Occupation - Combat	2.064	1.732	(-1.338, 5.466)	0.184	0.234
Occupation - Construction	1.779	2.178	(-2.499, 6.057)	0.052	0.414
Occupation - Electronic or electronical equipment	0.557	1.744	(-2.868, 3.982)	0.044	0.749
Occupation - Engineering, science, and technical	1.513	1.768	(-1.96, 4.986)	0.100	0.392
Occupation - Health care	1.691	1.801	(-1.846, 5.229)	0.101	0.348
Occupation - Human resources	0.697	2.001	(-3.232, 4.627)	0.026	0.728
Occupation - Machine operator and repair	1.644	2.362	(-2.996, 6.284)	0.040	0.487
Occupation - Media and Public Affairs	0.700	2.441	(-4.094, 5.494)	0.016	0.774
Occupation - Protective Services	3.243	1.875	(-0.439, 6.925)	0.156	0.084
Occupation - Support services	1.695	2.353	(-2.927, 6.317)	0.041	0.472
Occupation - Transportation and material handlers	3.041	1.823	(-0.54, 6.623)	0.162	0.096

Variable	*B*	*SE*	95% CI	β	*p*
Occupation - Vehicle and other mechanics	2.027	1.813	(-1.533, 5.587)	0.107	0.264
Occupation - Unusual careers	3.567	2.292	(-0.934, 8.068)	0.093	0.120
Occupation - Other	1.976	1.751	(-1.464, 5.416)	0.155	0.260
Race/Ethnicity - American Indian or Alaska Native	4.525	2.024	(0.549, 8.5)	0.118	0.026
Race/Ethnicity - Asian	-0.014	1.845	(-3.637, 3.609)	0.000	0.994
Race/Ethnicity - Black or African American	2.109	1.513	(-0.863, 5.081)	0.109	0.164
Race/Ethnicity - Native Hawaiian or Other Pacific Islander	0.314	2.183	(-3.974, 4.601)	0.007	0.886
Race/Ethnicity - White	0.426	1.303	(-2.134, 2.986)	0.035	0.744
Race/Ethnicity - Multi-racial	1.066	1.644	(-2.163, 4.295)	0.042	0.517
Race/Ethnicity - Unknown	5.262	4.619	(-3.81, 14.333)	0.049	0.255

Note: $R^2 = .023$, $F(32, 578) = 1.457$, $p = .052$

Research Question 5

RQ5: Is there a statistically significant relationship in military branch, rank, occupation, status (i.e., veteran, retiree, active-duty military), gender, race, and work environment factors on BMI? The results from the multiple linear regression to predict the relationship between BMI score from military branch, rank, occupation, and current military status (i.e., Active Duty/Reservist, Retiree/Veteran), gender, race, and work environment factor score are found in Table 26. The multiple regression model failed to achieve a statistically significant relationship between the predictors and BMI, although the model approached statistical significance ($p = .059$).

Table 26

Multiple Linear Regression Predicting Body Mass Index With Work Environment

Variable	*B*	*SE*	95% CI	β	*p*
(Constant)	29.977	2.567	(24.934, 35.02)	-	0.000
Work Environment	-0.020	0.122	(-0.26, 0.22)	-0.007	0.872
U.S. Army	-0.575	0.458	(-1.474, 0.324)	-0.065	0.210
U.S. Marine	-1.463	0.763	(-2.961, 0.035)	-0.087	0.056
U.S. Navy	-0.600	0.533	(-1.647, 0.446)	-0.054	0.261
Other (Coast Guard, Space Force, Prefer Not to Say)	-0.299	1.120	(-2.499, 1.9)	-0.012	0.789
Enlisted	-3.730	2.197	(-8.045, 0.585)	-0.420	0.090
Warrant Officer	-3.503	2.471	(-8.356, 1.35)	-0.124	0.157
Officer	-4.571	2.214	(-8.919, -0.224)	-0.508	0.039
Gender (Male/Female)	-1.560	0.670	(-2.876, -0.244)	-0.100	0.020
Military Affiliation (Active Duty/Reservist and Retiree/Veteran)	0.642	0.858	(-1.044, 2.328)	0.033	0.455
Occupation - Administrative	1.925	1.751	(-1.514, 5.364)	0.141	0.272
Occupation - Combat	1.968	1.736	(-1.442, 5.378)	0.176	0.257
Occupation - Construction	1.679	2.189	(-2.621, 5.979)	0.049	0.443
Occupation - Electronic or electronical equipment	0.435	1.747	(-2.995, 3.866)	0.034	0.803
Occupation - Engineering, science, and technical	1.415	1.772	(-2.066, 4.895)	0.094	0.425
Occupation - Health care	1.584	1.810	(-1.971, 5.139)	0.095	0.382
Occupation - Human resources	0.623	2.006	(-3.317, 4.563)	0.023	0.756
Occupation - Machine operator and repair	1.466	2.359	(-3.169, 6.1)	0.036	0.535
Occupation - Media and Public Affairs	0.666	2.444	(-4.135, 5.466)	0.015	0.785
Occupation - Protective Services	3.093	1.879	(-0.597, 6.783)	0.148	0.100
Occupation - Support services	1.610	2.356	(-3.018, 6.238)	0.039	0.495
Occupation - Transportation and material handlers	2.973	1.825	(-0.61, 6.557)	0.158	0.104

Variable	*B*	*SE*	95% CI	β	*p*
Occupation - Vehicle and other mechanics	1.883	1.822	(-1.695, 5.461)	0.099	0.302
Occupation - Unusual careers	3.429	2.291	(-1.071, 7.93)	0.089	0.135
Occupation - Other	1.856	1.754	(-1.59, 5.302)	0.146	0.291
Race/Ethnicity - American Indian or Alaska Native	4.524	2.026	(0.546, 8.503)	0.118	0.026
Race/Ethnicity - Asian	0.003	1.846	(-3.622, 3.629)	0.000	0.998
Race/Ethnicity - Black or African American	2.121	1.514	(-0.853, 5.095)	0.110	0.162
Race/Ethnicity - Native Hawaiian or Other Pacific Islander	0.286	2.184	(-4.003, 4.576)	0.006	0.896
Race/Ethnicity - White	0.452	1.304	(-2.109, 3.014)	0.037	0.729
Race/Ethnicity - Multi-racial	1.099	1.646	(-2.134, 4.332)	0.044	0.505
Race/Ethnicity - Unknown	5.605	4.608	(-3.445, 14.655)	0.052	0.224

Note: $R^2 = .022$, $F(32, 578) = 1.438$, $p = .059$

Summary

Statistical testing was conducted to determine if a statistically significant relationship exists in the frequency of physical activity in the military branch, rank, occupation, current military status, gender, and race. Testing was also performed to determine if a relationship exists between military branch, rank, occupation, current military status, gender, race/ethnicity, and the office-related exercise determinant factors (i.e., intrinsic motivation, extrinsic motivation, social environment, work environment) on BMI. The results from the multinomial logistic regression model were reviewed, and it was determined that the model was a fit for military variable data obtained based on statistical significance. The results from the multiple linear regression indicated that a statistically significant relationship exists in military branch, rank, occupation, current

military status (i.e., Active Duty/Reservist, Retiree/Veteran), gender, race, and the office-related exercise determinant factors, excluding the social and work environments, on BMI.

Chapter 5: Discussion, Conclusions, and Recommendations

This study aimed to examine the physical activity and office-related determinants of exercise and the relationship to body composition within the military community. I sought to determine whether an association exists between physical activity frequency and office-related determinants of exercise and military demographics. Military factors included military affiliation (e.g., active duty, retiree), military occupation, military rank, along with gender and race/ethnicity. The office-related determinants consisted of intrinsic motivation, extrinsic motivation, social environment, and work environment factors.

This study included a quantitative approach with a self-administered questionnaire administered through SurveyMonkey. The methods allowed differences to be assessed within the military community concerning physical activity frequency, BMI, and exercise determinants. Seven hundred fifty-seven current and former service members voluntarily completed the survey. The study looked to improve knowledge surrounding the determinants of exercise and components of the military culture that may contribute to the increased prevalence of service members who are overweight or obese and the frequency of physical activity.

Interpretation of Findings

The findings of this study showed statistical significance in the model in predicting the frequency of physical activity and the ability to predict BMI based on the identified variables, which included office-related determinants to exercise. The findings appear to corroborate and support the peer-reviewed literature reviewed in Chapter 2,

suggesting further investigation into determinants of exercise within the military community and the associated impact on BMI (see Nelson & Gordon, 2003; Schulze et al, 2016). Of the office-related determinants, no statistical significance was found when the social environment factor was included in the regression model. The interpretation and comparison of the research findings with the literature review provided in Chapter 2 are discussed according to the following five research questions.

Research Question 1

RQ1: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, and race/ethnicity on physical activity frequency? Baseline comparisons between current and former service members indicated a nonstatistically significant difference in frequency of physical activity. However, statistical significance was identified between males and females, with the duration of moderate and vigorous physical activities in males being longer than in females. The difference is opposite to the gender difference observed by Schulze et al. (2016), aligning with the male respondents indicating greater strength training by Meadows et al. (2021) in the HRBS. The time spent walking was also statistically significant in respondents based on occupation, indicating that military members in nonlabor occupations reported a greater walking duration compared to laborious occupations (e.g., combat, construction).

The data analysis for RQ1 indicates a differing result for goodness of fit, with the determination made that the model is an overall good fit, as a non-statistically significant result was observed using deviance. When exploring the frequency of physical activity,

durations of less than 30 minutes and a duration of 30 to 59 minutes were statistically significant at a .05 level of significance. Both durations are relative to those indicating no physical activity with occupation as a predictor. This relationship is evident for service members in laborious occupations at durations of less than 30 minutes, and 90 to 149 minutes, and both labor and non-labor occupations for durations between 30 and 59 minutes and over 150 minutes. As the duration of physical activity was identified in Chapter 2, the relationship between the included predictor variables and physical activity was not evaluated (Cavalcante Neto et al., 2019; Heinrich et al., 2022; Meadows et al., 2021). Current military policy prescribes minimum frequencies of physical activity for each military branch, emphasizing the relationship between physical readiness and the correlation to the mission (Chairmen of the Joint Chiefs of Staff, 2011; Clerc et al., 2021).

Research Question 2

RQ2: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and intrinsic motivation factor on BMI? Data analysis for RQ2 showed statistical significance among multiple predicators for BMI although the regression model did not explain a large portion of the variation ($R^2 = .07$). The significant relationship at a level of .05 level of significance based on intrinsic motivation, gender, military affiliation, rank, and within those identifying as American Indian or Alaska Native and Black or African American. Additionally, the independent samples t-test identified statistical significance in intrinsic motivation between current service members and

former service members. The active-duty military intrinsic motivation factor score (M = 4.53) was found to be higher than that of retirees. Higher mean scores were also observed for intrinsic motivation for officers (M = .434) compared to enlisted (M = .414). Intrinsic motivation factors include determinants that consist of competence and enjoyment of exercise.

As regular physical activity contributes to sustaining BMI and preventing the prevalence of excessive body fat and obesity, relationships between gender and BMI are established to include quality of life metrics within populations, noting intrinsic motivations like physical appearance as motivators (Lalović et al., 2025). Intrinsic motivation factors included competence and enjoyment determinants associated with physical activity participation. The contribution of intrinsic motivation to physical activity is essential as intrinsic motivation includes metrics of satisfaction and pleasure, establishing a culture of physical activity that extends throughout a military career (Malkawi et al., 2025).

Research Question 3

RQ3: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors on BMI? The data analysis for RQ3 indicates a statistically significant relationship between the predictor variables and the BMI at a .05 significance level. Overall, the model indicates that military affiliation (i.e., active duty/reservist, retiree/veteran), gender, race/ethnicity, and extrinsic motivation factors predict BMI. Specifically, a significant relation exists among extrinsic motivation,

gender, rank, and identifying as American Indian or Alaska Native on BMI. The independent samples t-test was also statistically significant for the comparison of means for extrinsic motivation factors. Active-duty military reported higher extrinsic motivation ($M = 4.53$) compared to $M = 4.20$ for retirees, as well as between officers ($M = 5.87$) and enlisted ($M = 5.56$).

Extrinsic motivations included perceived health determinants that included responses to how exercise improved mental health, muscle strength and tone, body function, and blood pressure. Extrinsic motivation factors and military characteristics may influence body composition and regular participation in physical activity, as the relationship is associated with improved quality of life (Lalović et al. 2025).

Research Question 4

RQ4: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., active duty/reservist, veteran/retiree), gender, race/ethnicity, and social environment factors on BMI? Data analysis for RQ4 did not show statistical significance at the .05 level of significance among the predictor variables, military affiliation, gender, race/ethnicity, and social environment on BMI. Although not significant, the model was marginally statistically significant ($p = .052$) with significant predictors being an officer, female, and identifying as an American Indian or Alaska Native. Concerning the independent samples t-test, statistical significance was observed at the 0.5 level based on military affiliation. The social environment factor mean score was higher in active duty ($M = 3.74$) compared to retiree ($M = 3.34$), denoting higher satisfaction between the two groups.

The social environment includes family and friend influence, colleague influence, and superior influence as determinants. Higher mean scores for active-duty military (i.e., active duty, reservist) would indicate higher satisfaction with influence towards exercise behavior at work compared to former military (i.e., retiree, veteran). Statistical significance was observed among the social factors, further aligning with influence from formal and informal relationships as a part of the interpersonal level of the SEM (McLeroy et al., 1988).

Research Question 5

RQ5: Is there a statistically significant relationship in military branch, rank, occupation, military affiliation (i.e., veteran/retiree, active duty/reservist), gender, race/ethnicity, and work environment factors on BMI? Statistical significance at the .05 level of significance was not indicated for RQ5, although the model was marginally significant ($p = .059$). The data analysis explored military branch, rank, occupation, military affiliation (i.e., veteran/retiree, active duty/reservist), gender, race/ethnicity, and work environment factors as potential predictors of BMI. Within the model, statistically significant predictors were the rank of officer, being female, and identifying as an American Indian or Alaska Native. A comparison of means determined statistical significance at the .05 level when comparing work environment to military affiliation and rank category. Results indicate higher satisfaction among officers ($M = 3.63$) than enlisted ($M = 3.37$) and for current active duty ($M = 4.25$) compared to retiree ($M = 3.42$) for the work environment factor. Determinants that comprise the work environment are work pace, break time, the policy of the company, and work burden.

With overarching policy and guidance on physical activity participation and weight standards, the prevalence of service members classified as obese, as determined by BMI, has grown. The Defense Health Agency Public Health (2025) indicates the average BMI for current service members as 23%, with the highest prevalence found in the U.S. Navy (27%) and the lowest prevalence in the U.S. Marine Corps (13%). Gender differences were also observed by the U.S. Department of War, as 19% of active-duty females and 24% of males are classified as obese (Defense Health Agency Public Health, 2025). Additionally, the prevalence of obesity differs based on age and ethnicity. Service members identifying as Native Hawaiian/Pacific Islander had the highest prevalence of obesity in males (36%) and females (27%), and service members 35-44 years of age had the highest prevalence of obesity (Defense Health Agency Public Health, 2025). In female service members, 29% of those 35 to 44 years of age were classified as obese, 35% of males 35 to 44 years of age were also classified as obese with the U.S. Navy having the highest prevalence of obesity within the age groups, 34% (female) and 39% males (Defense Health Agency Public Health, 2025). With physical activity being required in policy, the self-reported participation in physical activity has varied. Reports of service member participation have ranged from 57% to 82% although the prevalence of obesity increases within the U.S. military (Smith et al., 2013; Defense Health Agency Public Health, 2025). Weight management resources contribute to a reduction in the prevalence of obesity by placing a greater emphasis on physical activity and impacts from military deployments (Bates et al., 2013; Lubens & Bruckner, 2018). The work determinants influencing physical activity, participation, and prevalence of obesity within

the military community require the necessary resources and attention to work-related exercise behaviors, gender, and ethnic differences attributable to BMI.

Limitations

The following limitations of this study should be considered and were identified. Survey respondents were limited to Walden students and recipients of Stars and Stripes engagement emails. As a result, the generalizability of the current and former service members' findings may be limited, as a convenience sample was used to obtain the survey results, which limits replicability (see Jager et al., 2025). As the survey data were self-reported, respondents may have been prone to self-reporting bias due to social desirability bias and recall bias. According to Larson (2024), social desirability bias may be a factor if responses are considered sensitive, not treated with confidentiality, or when the respondent is seeking social approval. Additionally, responses required recall of physical activity behavior, introducing recall bias associated with survey responses. Recalling information can also lead to a recall error, resulting in inaccurate recall as recall bias is often related to social desirability bias (see te Brea et al, 2023). To minimize self-reported bias, respondents were informed that the survey was confidential, including IRB approval, and that recall information was limited to a 7-day physical activity recall.

The data analysis was performed on survey results of up to 757 current and former U.S. service members. Along with self-reporting military status (i.e., active duty, reservist, retiree, veteran), further military characteristics were collected, which include military rank, military branch, and occupation, all self-reported. Total survey respondents

were sufficient for statistical power and minimum sample size for multiple linear regression and multinomial logistic regression (see de Jong, 2019; Seabrook, 2025).

The study sought to explore the work-related determinants and physical activity behaviors among current and former service members. Questions associated with serving in the military captured the current military status with response sub-categories limited to: active, retiree, veteran, and other. For retirees and veterans, injury or discharge status was not identified, potentially impacting the respondent's ability to be physically active due to sustained mental or physical injury.

Finally, the study was unique as it explored the relationship between work-related exercise behavior, physical activity frequency, and BMI within the military community to identify factors associated with the increased prevalence of obesity within the U.S. military.

Threats to Validity

The following are threats to internal and external validity.

Internal Validity

As defined by Patino and Ferreira (2018), internal validity is attributed to the study results accurately reflecting the population being studied. Accurate responses are crucial in determining the causal link between predictors of physical activity and BMI. Internal validity supports reliable conclusions based on the sample survey respondents. Responses to the military characteristics support internal validity as the study sought to explore military health behaviors. Based on the nature of the research and research design, testing, statistical regression, maturation, experimental mortality, and

demoralization were not threats to internal validity. Identified threats to internal validity of the study remained history and selection bias.

Survey respondents' internal validity associated with their history is susceptible to threats that could influence the outcomes and responses (see Baddie, 2017). The history of the participants presented an unknown threat, as unknown or associated events or circumstances influence physical activity, BMI, and responses to work-related exercise determinants.

External Validity

External validity of the study pertains to the generalizability and applicability of the study, specifically relating to the surveyed samples' representation of the larger population (see Murad et al., 2018). The partnership with Stars and Stripes allowed for the selection of survey participants to target respondents with a military affiliation. Additionally, the study design contributed to the control responses to improve external validity.

Recommendations

The study presents lessons associated with the relationship between military factors as predictors of physical activity and BMI. Within the military, gender, rank, and branch differences associated with the classification of obesity are known. A reasonable association could be made that physical activity participation, gender, and military branch would influence the body composition of service members during and after military service. The factors influencing physical activity within the military community may vary based on the specific military branch, occupation, military rank, and race/ethnicity.

The data analysis provided statistical significance for predictors on physical activity frequency and BMI. Significance was determined for predictors (i.e., military branch, rank, occupation, military affiliation, gender, and race/ethnicity) on physical activity frequency. An association existed among labor and non-labor military occupations performing physical activity, along with race/ethnicity and rank differences. There was a statistically significant difference between rank categories (i.e., enlisted, officer) and gender corresponding to duration of physical activity and type of physical activity performed. When exploring the relationship between the predictors, including intrinsic motivation, extrinsic motivation, statistical significance was achieved to predict BMI, with no statistical significance when the predictors were combined with work environment or social environment. The work environment is still believed to be influential on BMI, as the military culture and policy outline requirements and support for current service members. Additionally, behaviors attributable to the military service and resources provided by the U.S. Department of Veterans Affairs support sustained physical activity and ideal body composition.

It is essential to continue researching the influential factors on service members who are classified as overweight or obese. The relationship between caloric consumption and weight status is attributable to the fact that caloric consumption has an impact on the weight of service members. In addition to the determinants of physical activity, the military environment, and potential nutrition environment may be the key to optimal weight management during and after military service. The establishment of ideal behaviors could lead to improved outcomes within the military community through

reductions in obesity-related health costs. If left unaddressed, service members' weight would become a greater impediment to readiness and the ability of the U.S. Department of War to complete its mission.

Implications for Social Change

The data analysis provided statistical significance and findings consistent with peer-reviewed literature from Chapter 2, suggesting differences exist among physical activity frequency and obesity within the military (Defense Health Agency Public Health, 2025; Meadows et al., 2021). Previous research was limited to solely the frequency of physical activity, weight status, military branch, or occupation-specific exercise behaviors (Defense Health Agency Public Health, 2025; Meadows et al., 2021; Mullie et al., 2013; Nelson & Gordon, 2003). In addition, this study and its findings are important contributors to the literature on military physical activity and BMI classification. This is believed to be the first study assessing the multiple military predictors, along with the work-related exercise determinants, on BMI.

The data analysis reflects the ability to predict BMI based on multiple military predictors that include various determinants. The results also reflect significance between military factors like gender, rank, occupation, and military affiliation on the work-related determinants. Intrinsic motivation, extrinsic motivation, work environment, and social environment are associated with the SEM levels, establishing a positive or negative influence on desired outcomes or behavior (Benisti, G., & Baron-Epel, 2023; Porter et al., 2021; Yoongu & Sanghyun, 2021). Finally, the data offers useful insight to health educators, policy makers, and military physical readiness stakeholders in the further

development of policy and a culture to improve the weight status and frequency of physical activity within the current and former service members.

Conclusion

With both statistically significant and non-significant results in this study on the relationship between predictors of physical activity and BMI, physical activity and obesity remain areas of concern within the military community (Centers for Disease Control and Prevention, 2024b; Defense Health Agency Public Health, 2025). The U.S. Department of War has reported an increase in the prevalence of service members classified as obese. The prevalence of obesity has increased from 17.4% in 2018 to 23% in 2023 (U.S. Department of Defense, 2019; Defense Health Agency Public Health, 2025). Similarly, trends in physical activity frequency continue to vary, although the self-reported frequency indicates that the majority of service members met the minimum recommendations for physical activity, the prevalence of current and former service members continues to increase.

As obesity costs continue to increase for the U.S. Department of War and the U.S. Department of Veterans Affairs, the U.S. Department of War should continue to investigate the relationship the workplace culture has on health behavior. Physical activity participation is one element, with nutrition potentially being a contributor for future research. Continued investment into health behaviors and resources that support physical activity and ideal body weight will aid in the fulfillment of the mission of the U.S. Department of War and overall positive health outcomes of current and former service members.

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Appendix A: Stars and Stripes Partnership Correspondence

Outlook

RE: Ph.D Research Survey Support

From Ira Seth <ira.seth@waldenu.edu>
Date Tue 10/1/2024 12:11 PM
To Verigan, Chris <verigan.chris@stripes.com>

Perfect.

Sent from my T-Mobile 5G Device

-------- Original message --------
From: "Verigan, Chris" <verigan.chris@stripes.com>
Date: 10/1/24 6:04 PM (GMT+01:00)
To: Ira Seth <ira.seth@waldenu.edu>
Subject: Re: Ph.D Research Survey Support

Ok, we will send out the survey on October 9. That works best with our current schedule.

Chris Verigan
Stars and Stripes
Director of Engagement
T: 202 886 0006 | E: verigan.chris@stripes.com
www.stripes.com

From: Ira Seth <ira.seth@waldenu.edu>
Sent: Tuesday, October 1, 2024 12:02 PM
To: Verigan, Chris <verigan.chris@stripes.com>
Subject: RE: Ph.D Research Survey Support

To ensure that the results have statistical power I need to collect over 200 responses. I am thinking I will keep the survey open for one to two months.

Sent from my T-Mobile 5G Device

Appendix B: Walden Participant Pool Confirmation

Outlook

Confirmation of Study Posting

From Participant Pool <participantpool@mail.waldenu.edu>
Date Sun 10/6/2024 7:56 PM
To Ira Seth <ira.seth@waldenu.edu>
Cc Participant Pool <participantpool@mail.waldenu.edu>

Hi Ira,

Thank you for providing this information, your study has been posted on the Walden University Participant Pool. Once your data collection is complete and you no longer need your study to be posted, please notify the Participant Pool Administrator via email so your posting can be removed from the site. Good luck as you begin data collection!

As a member of the Participant Pool community, you may be interested in taking part in one of the other studies posted on the webpage. Please feel free to volunteer if you find an opportunity you qualify for.

Sincerely,
Participant Pool Coordinator
Walden University
100 Washington Avenue South, Suite 1210
Minneapolis, MN 55401
Phone: (612) 257-6505

From: Walden Participant Pool <surveys@mail.waldenu.edu>
Sent: Sunday, October 6, 2024 7:57 AM
To: Participant Pool <participantpool@mail.waldenu.edu>
Subject: [external] Participant Pool Request from ira.seth@waldenu.edu

Below is a copy of the **Participant Pool Request** that was just received from the researcher. The Participant Pool Manager will be in touch as soon as possible (within 10 business days) to confirm whether the study has been posted.
Download as PDF

URL to view Results	[Click Here]

Response Summary:

. 1. Enter the researcher's email address. (For interview studies, this email address will be posted publicly on the participant pool webpage so volunteers can contact you.)
ira.seth@waldenu.edu

. 2. Study title:
Determinants of Military-related Office Physical Activity Behavior

Appendix C: Walden University IRB Approval

Outlook

IRB Materials Approved

From IRB <irb@mail.waldenu.edu>
Date Mon 6/24/2024 3:25 PM
To Ira Seth <ira.seth@waldenu.edu>
Cc IRB <irb@mail.waldenu.edu>; Tarver, Debran <debran.tarver@mail.waldenu.edu>

1 attachment (15 KB)
Seth Consent Form.docx;

Dear Ira Seth,

This email is to confirm that, based on your responses to Form A, your study appears to fall within the parameters of the IRB pre-approved Anonymous Survey Manual. This means that you are permitted to collect and analyze data from anonymous surveys, as per the terms of the pre-approved Consent Form (Appendix C) in the Anonymous Survey Manual. No other data may be collected by you without prior approval from the IRB.

Your approval # is 06-24-24-1014873. You will need to reference this number in your final doctoral study and in any future funding or publication submissions. You are required to use the consent form provided in the Anonymous Survey Manual. A copy of this consent form tailored to include your IRB approval number is attached, and no edits may be made to this approved text.

Your IRB approval expires on June 23, 2025 (or when your student status ends, whichever occurs first). One month before this expiration date, you will be sent a Continuing Review Form, which must be submitted if you wish to collect data beyond the approval expiration date.

Your IRB approval is contingent upon your adherence to the exact procedures described in the Anonymous Survey Manual and the final version of the IRB form that has been submitted as of this date. This includes maintaining your current status with the university. Your IRB approval is only valid while you are an actively enrolled student at Walden University. If you need to take a leave of absence or are otherwise unable to remain actively enrolled, your IRB approval is suspended. Absolutely NO participant recruitment or data collection may occur while a student is not actively enrolled.

If you need to make any changes to your project procedures, you must obtain IRB approval by submitting the IRB Request for Change in Procedures Form. You will receive confirmation with a status update of the request within 10 business days of submitting the change request form and are not permitted to implement changes prior to receiving approval. Please note that Walden University does not accept responsibility or liability for doctoral scholarship activities conducted without the IRB's approval, and the University will not accept or grant credit for student work that fails to comply with the policies and procedures related to ethical standards in research and scholarship.

When you submitted your IRB application, you made a commitment to communicate both discrete adverse events and general problems to the IRB within 1 week of their occurrence/realization. Failure to do so may result in invalidation of data, loss of academic credit, and/or loss of legal protections otherwise available to the doctoral student.

Appendix D: Office Exercise Behavior Determinants Scale Approval

Outlook

Re:Re:Office Exercise Behavior Determinants Scale

From 任熹培 <x.ren@bit.edu.cn>
Date Thu 10/12/2023 9:27 PM
To Tianmei Zhang <bit_mia333@yeah.net>; Ira Seth <ira.seth@waldenu.edu>
Cc j.r.c.ham@tue.nl <j.r.c.ham@tue.nl>

Hi Ira,

Thank you for reaching out.It is also no problem for me to apply the scale in your research. Good luck with preparing the proposal.

Kind regards, Xipei

---------- Origin message ----------
>From: "Tianmei Zhang" <bit_mia333@yeah.net>
>To: "Ira Seth" <ira.seth@waldenu.edu>
>Subject: Re:Office Exercise Behavior Determinants Scale
>Date: 1970-01-01 08:00:00

> Hi Ira,
>
> Thanks for your email.
>
> As for me, I think you can use the OEBD scale we have developed in your research. And I believe all the items of the scale have already been listed in the article. If you need any additional information, please feel free to contact us.
>
> Best wishes for your research.
>
> Tianmei.
>
> | |
> Tianmei Zhang
> |
> |
> bit_mia333@yeah.net
> |

Appendix E: International Physical Activity Questionnaire

IPAQ

Home FAQ Download Adapt Score Submit References

IPAQ - International Physical Activity Questionnaire

Welcome!

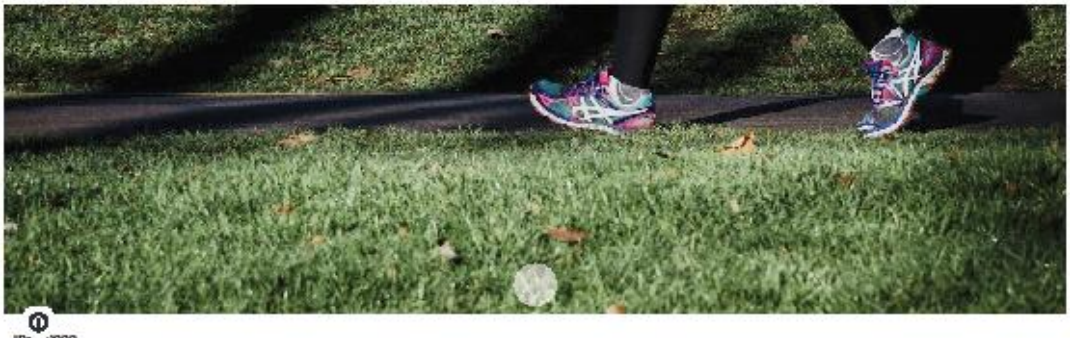
The International Physical Activity Questionnaire (IPAQ) is a well-developed and widely-used instrument that can be used to obtain comparable estimates of physical activity between populations and countries. It was designed for physical activity surveillance so it is particularly useful for large population studies, but can be used with care in other contexts.

On this site you will find:

- background about the development of the IPAQ questionnaire
- information about the correct use of the questionnaire
- information about how you can adapt the questionnaire
- links to the questionnaire itself, in multiple languages

Please note:

- The IPAQ questionnaire is **publicly available**, it is **open access**, and **no permissions are required to use it**.
- We unfortunately cannot provide individual support to researchers or students. This website is maintained on a purely voluntary basis.
- We strongly recommend you begin by reading the Frequently Asked Questions!



IPAQ 2022